

The Blue Guitar

Peavey Classic 30 mods: Revisited

Introduction

It has been a year since I completed the mods on my Peavey Classic 30 described in the previous articles on this site, and I decided it was time to go back inside the amp and simplify things a bit. When adding a switch or control to a circuit, you always run the risk of increasing the noise and/or capacitance effects from the added cabling, etc. So I figured I ought to take out those switches and controls that I hardly ever use, and streamline the remaining ones. In addition to this article I have also prepared annotated versions of the schematic and layout drawings indicating which parts are to be replaced, along with the type and value of the component. In the annotated schematic, I have colorized the parts or values to be replaced in blue ink. New components or values are drawn in with red ink. In addition, I have colorized the labels of caps to be upgraded as follows: orange for Sprague Type 418P Orange Drop caps and purple for silver mica caps.

Perhaps I should briefly summarize those mods that I find to be indispensable. The basic changes to the tone stack and boost circuit are a definite keeper, especially with the revised values spelled out in this article. It is optional whether you want to add in the relay board to connect the boost to the footswitch; I have simplified the design of the relay board, eliminating the alternate value for the bass cap. There are various caps and resistors throughout the circuit that have been replaced with higher quality components and/or different values; I have listed those parts which I find to be critical for a decent sound from the amp in the annotated schematic. Although not mentioned prominently in the original articles, I also strongly recommend "Fenderizing" the inputs, removing the caps and using just a 33k series resistor and a 1M resistor to ground; rewiring the inputs to the specs used in the BF and SF Fenders makes the amp more responsive to a nice set of pickups.

The added bias adjustment pot is an important feature if you want to fine-tune your amp to work with any set of EL84's for the output section. I have simplified the installation of a 1 ohm resistor used to measure the current for all 4 output tubes; rather than cut traces to mount a 5 watt resistor directly on the circuit board you can replace the hinged jumper wire on the very end with a precision 1 ohm 1 or 2 watt resistor.

I also find the added master volume control to be very useful; by setting the MV down to 4 or 5 there is a considerable reduction of background hum and hiss coming from the speaker which can be important if you are miking the amp. And at lower settings of the MV you can really crank up the preamp without blasting out your neighbors.

I did scrap the OD Tone control, replacing the stock 10k resistor in that circuit with an 8.2k resistor, which removes some of the harshness and "fizziness" from the OD channel, allowing for a better tonal balance with the Normal channel. It does not actually change the character of the OD sound; it is more like just setting the Treble control back a notch or two.

As for the pseudo "Presence Control" from the earlier articles (actually a "variable Negative Feedback Loop control"), I removed that pot and added in a **real** Presence Control borrowed from the circuit for the Classic 50. If you choose to not install the optional Presence Control you may want to try hardwiring in a larger value for the 100k feedback resistor; a 120k or 130k resistor would "liven up" the response of output section a bit.

I did leave in the Ck switches for V1A and V2B, along with a switch to select between a 0.001uF and 0.01uF coupling cap for C2 after V2A. I consider Ck switches to be a "no-brainer" because they add in extra tones to your existing preamp(s) at the expense of a chassis hole and a toggle switch. And for vintage amps, you could always replace one of the controls with a push-pull pot to add the switching without having to drill a hole. With some coupling caps if I can't make up my mind between two values I'll just throw in a switch to select between either of them.

An Overview of the essential mods

Let us proceed through the audio signal path and I will outline the mods which I believe are essential. Starting at the Input Jack I prefer the basic tried-and-true input circuitry of the classic Fender and Marshall amps, rather than the more complicated circuit used by Peavey which squelches the sound of a nice vintage-style pickup. So the stock caps and resistors are scrapped and replaced with a single 1 meg resistor to ground and a 33k series resistor going to Pin #2 of V1. As for V1A, which is the initial gain stage shared by both channels, I like adding in a center-off DPDT mini-toggle switch to select between 3 values for the cathode resistor bypass capacitor (aka "Ck"). The stock 22uF electrolytic cap (aka "e-cap") is the traditional value used by Fender for a very full sound with plenty of gain. The first alternate value I suggest would be a poly cap around 0.68uF which is the traditional value used by Marshall for a more midrangy (or warm) sound. The other alternate value I suggest would be 0 uF (the center-off position of the switch) which has less gain, a flatter frequency response and an increase in the clean headroom. I generally use the 0.68uF or 22uF settings for OD sounds and the 0 uF or 22uF settings for the Clean sounds.

The audio signal leaving the first stage passes through the 0.047uF coupling cap and then branches off to the Normal volume control and the OD Pre gain control through caps and resistors. The signal going to the Normal channel pot passes through a 680k resistor (R8) bypassed with a 0.001uF cap (C9). You can improve the signal going to the Normal channel by replacing the stock 0.001uF cap; my favorites are a 1000pF silver mica cap for a slightly brighter sound or a 0.001uF SBE418P Orange Drop cap for a fuller sound. You can raise the value of the cap a bit to boost the signal from the Normal channel although that will make it distort more when you crank it up (which is not

necessarily a bad thing). To increase the treble response of the Normal channel at lower settings of its volume pot you can add in a "bright" cap across the two ungrounded terminals of the pot. For a subtle treble boost I prefer a very small mica cap such as 22uF or 47uF (the traditional values used by Fender and Marshall of 120pF, 500pF or even 0.001uF will be way too bright in the Classic 30). The signal from the Normal volume pot wiper is then routed to the channel switching circuitry.

It is the 470pF cap (C4) going to the OD Pre gain pot that I believe contributes to much of the harshness of the OD channel. If you want a fuller sound from the OD channel you can replace this cap with a silver mica cap between 680pF and 820pF, and optionally bypass it with a resistor of 470k to 1k. The higher value cap will allow more of the lower frequencies through, while the optional resistor will increase the overall gain and distortion of the OD channel along with boosting the low frequencies even more. If you are looking for maximum distortion you can try a 470k resistor bypassed with a 1000pF cap (as used on the Normal channel). The audio signal is then shaped a bit by a 470pF cap (C7) and 2.2M resistor (R9) in parallel going to ground immediately before the grid of V2A. As other mods described in this article tend to remove most of the harshness of the OD channel, that 470pF cap can be replaced with a smaller value such as a 390pF mica cap, or eliminated altogether. The 2.2M resistor (part of the grid load for V2A along with the 1M Pre gain pot) can be replaced with a 1M resistor to reduce the gain and distortion of the OD channel a bit.

The audio signal from V2A passes through a 0.001uF coupling cap (C2) and through a contour network consisting of a 470pF cap (C1) and a 470k resistor (R5). At this point there is a 470k grid load resistor to ground (R11), so the contour network also acts as a voltage divider circuit to reduce the signal going into V2B. The 0.001uF coupling cap can be replaced with a Sprague Type 418P cap to improve the overall sound of the OD channel; I added in a switch here to select between the 0.001uF cap on the board for brighter blues tones and an added 0.01uF cap on the full-sized toggle switch for thicker OD tones. As for the contour network I personally like the sound of a 390pF cap for C1 and a 390k resistor for R5 in the Classic 30; you get a stronger signal going to the grid of V2B, with not quite as much highs as the stock 470pF/470k combination.

The second stage used in the OD mode (V2B) uses a stock 22uF Ck cap (C15) to bypass the 1k cathode resistor R17 (aka "Rk"). If you are looking for cleaner or brighter sounds from the OD channel as an option, I'd suggest adding in a 2 position DPDT mini-toggle switch to select between the stock value of 22uF and an alternate value of 1.0uF. I generally use the 1.0uF Ck cap for V2B only when the Ck for V1A is set to 22uF; when used with a 0.68uF Ck cap for V1A the resulting tone is a bit too bright. Electronics theory tells us that the Ck cap in conjunction with the Rk resistor creates a high pass filter for the particular gain stage. The cutoff frequency for a 22uF cap is much lower than for a 1.0uF or 0.68uF cap. I believe that by staggering the different hp filters for the various gain stages a more complex OD sound can be created in a preamp than if the same value of Ck is used for all of the stages.

Getting back to the path of the audio signal through the OD channel, the 0.022uF coupling cap for V2B (C5) is preceded by a 1M resistor (R7) which trims back the gain

of the OD channel substantially. The signal then goes to the 10kA Post gain control (VR3), which is bypassed with a 10k series resistor R13 leading to a 0.015uF cap to ground (C16). This cap and resistor is like a treble-cut tone control on a guitar. Replacing the 10k resistor with a lower value such as 8.2k shaves off some of the harshness from the OD channel. Incidentally, the 10k value of the OD post gain pot seems very low for a tube amp circuit. I believe that Peavey used a 10k pot there to further attenuate the signal from the OD channel, possibly bleeding to ground much of the character of the OD channel gain stages. In the Tweed Bassman mod for the Classic 50, I replaced the stock 10kA pot with a small case 500k pot (commonly used on inexpensive imported guitars). Although I haven't tried it in the Classic 30, it might be an interesting experiment to replace the 10kA post gain pot with a 100kA pot. I believe that it would increase the overall gain of the OD channel a lot so the circuit may require additional "tweaking".

After the OD post gain pot the signal goes to the channel switching relay (K1b) and we rejoin the audio signal from the Normal channel here. After the relay the signal branches down to the ss reverb circuit through a 220k resistor (R20), while a 150k resistor (R14) goes to the grid of V1B, which is where the signal from the reverb circuit is mixed back in after passing through a 220k series resistor (R22). V1B is similar to V1A as they both use a 150k plate resistor (Rp), a 1k5 cathode resistor (Rk), a 22uF cathode resistor bypass cap (Ck) and a 0.047uF coupling cap. However, V1B also uses a 2.2M negative feedback resistor R21 between the grid and ac signal right after the coupling cap (aka dc blocking cap). The feedback resistor reduces the gain of V1B a bit, along with adding some stability to the circuit.

The 0.047uF coupling cap (C6) leads to the tone stack and boost cap, both of which can be modified to improve the sound of the Classic 30. These mods are explained in the next section.

As for adding in the relay board so that the boost can be activated with the footswitch, I decided to simplify the circuitry by removing the extra bass cap. With the revised directions it should be a lot easier to wire up. There is a link to the file (c30rlybd.pdf) at the end of this article.

Tone Cap Mods for the Classic 30

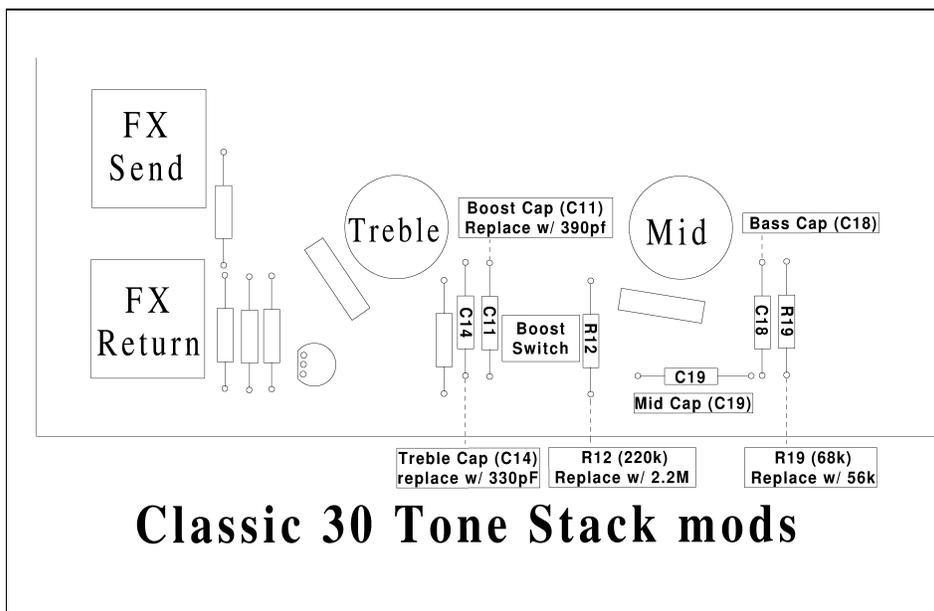
Modify the tonal response of this amp by replacing the tone and boost circuit caps!

By changing the values and style of capacitors used in the tone and boost circuitry of the Classic 30, the tonal response can be changed dramatically. Many amp builders and connoisseurs prefer Sprague Type 418P Orange Drop caps for the midrange and bass caps; many of them likewise prefer silver mica caps for the treble caps. Although some reputable amp techs will dispute the "magic mojo" of Orange Drop caps, most will agree that a good quality polyester or polypropylene cap rated at 400 to 630v will sound better than the junk caps used by Peavey. I recommend dealing with companies that specialize in parts for tube guitar amps since your local electronics parts house will insist that all caps of the same value will sound the same. Antique Electronic Supply is a good company to deal with; Mouser Electronics has better prices, but you need to know what style caps to order.

As for the values of the tone caps, Peavy uses a 270pf cap for treble and a pair of .022uf caps for midrange and bass. They also use a .047uf cap in the boost circuit, which drastically increases the gain and midrange response of the preamp. The boost cap bypasses the treble cap, in effect raising the value of the treble cap to the sum of the two values. Because of the very high value used (most boost circuits use a 750pf to .0015 cap) a 220k resistor to ground is used to reducing popping when the boost circuit is switched in or out.

For this mod, I recommend replacing the .022uf bass cap (C18) and mid cap (C19) with 0.022uf Sprague Type 418P "Orange Drop" cap for improved bass response. I originally put in a 270pf silver mica cap in place of the 270pf tubular ceramic treble cap (C14- it looks like a resistor but with a green body instead of a tan). However, I have since decided that a 330pF mica cap works much better in this circuit. I had overlooked changing the 68k slope resistor (R19) in my original mods for the Classic 30; I recommend replacing it with a 56k resistor to boost the bass and mid frequencies a bit when desired.

For the boost cap (C11), I originally recommended using a 750pf cap. With this value, the boost switch works similar to a Shift switch on an older Mesa Boogie amp: it kicks the volume up a notch and boosts the midrange response. For more boost and tonal shift, you can use a .001uf or .0015uf cap instead. Using smaller values such as these, the 220k resistor (R12) to ground could be eliminated or replaced with a very high value (I used a 2.2M resistor). With the stock boost cap, I found the gain boost and tonal shift to be too drastic to be usable for vintage blues tones. With the values I recommend, the boost switch offers an alternative voicing which retains much of the tone and character of the unboosted mode. Important note: although the 750pF boost cap adds a Boogie-like tonality to the amp, many people don't like that midrange boost and I have since decided that a 390pF boost works very well for the Normal channel as well as the OD channel. The boost is more subtle and it does not alter the tonality of the amp as much.



Master Volume Control

Adding a Master Volume control at the input of the power amp section greatly increases the versatility of the Classic 30. If you use the FX loop with certain fx processors you may have noticed how you must readjust the levels every time you adjust the volume on the Peavy. With the Master Volume mod detailed in this article, you can set the gain pots for the Normal and OD channels for the tones you want, and use the MV to control the overall volume without having to readjust the input and output levels of the FX processor.

Another advantage to having a Master Volume control is in using the FX return jack to slave the Classic 30 to another guitar amp or preamp. Without a MV control at the input to the power amp section, you have no control over the relative volume of the Peavy as it is running at full throttle.

Although those are the two reasons behind my adding the Master Volume control, I soon found a third reason after completing the mod: with the Normal volume kicked up high and the MV set back to the appropriate playing volume, you can get some really nice mildly-overdriven sounds which complement the higher-distortion sounds of the OD channel. (The OD channel generally needs to be set above 6 to produce a decent sound—you can't just set it low for a moderate amount of overdrive and distortion.)

While the master volume control adds much to the versatility of the Peavy Classic 30, unfortunately there are few accessible spots on the chassis where a switch or control can be added. The choicest location would be on the bottom of the chassis between V1 and the cabinet. I had already mounted 3 mini-toggle switches here before getting around to adding a master volume control to my amp. I do believe that you can fit in 2 mini-toggle switches towards the rear of the chassis with room to add a pot behind the switches, with all 3 components being fairly accessible. You would have to decide for yourself which control would get to "ride shotgun" in this location. If you need to play a lot at lower volumes, you'd probably want to put the master volume control here; if you usually play loud, you might want to have the presence control (aka feedback loop control) mounted here instead. One other option you may want to look into would be to mount one of the controls actually on the rear panel of the chassis here, but with the shaft cut short and a slot cut in it for screwdriver adjustment. (I think if a longer shaft and knob were sticking out of the back of the amp it'd be a matter of time before it got sheared off.)

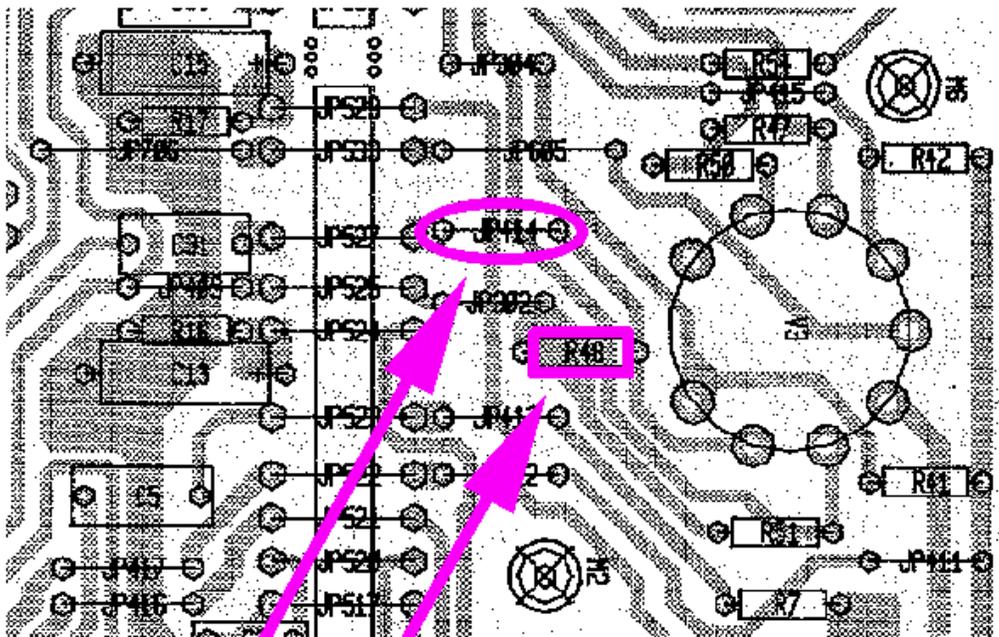
The pots and switches that you do not mount between V1 and the cabinet will need to be mounted on the bottom of the chassis behind the tubes where they are not exactly very accessible. It is a compromise necessitated by the design of the amp, although I have considered the idea of mounting the amp chassis in its own cabinet as a "Classic 30 head", with the auxiliary controls detailed in these articles mounted on the front panel (where the transformer leads are currently routed). With the amp chassis in its own cabinet you would eliminate some of the problems with running the amp at full volume such as rattling or microphonics (which can be a problem with the EI 12AX7 tubes and Orange Drop caps).

Master Volume Construction Notes

While the diagrams in the following section should be self-explanatory, there are a few things I should probably mention. For removing the components and soldering shielded cable to the circuit board, I have step-by-step instructions in c30_cksw.htm. For the Master Volume mod, you need to first remove R48 and JP414 from the Tube board, and then solder 2 conductor shielded cable to the pads indicated on the drawing below. I used a 22pf mica cap on the ungrounded terminals of the pot as a "bright" cap to keep the sound from getting muddy at low settings of the master volume control. You may want to try a larger valued cap, or eliminate it altogether. The 100k resistor in series with the pot wiper is optional; it will smooth out the response of the mv control but it will also reduce the signal going into the pre-driver by 10%. I tried it both ways and decided that the control worked much better with the resistor in the circuit.

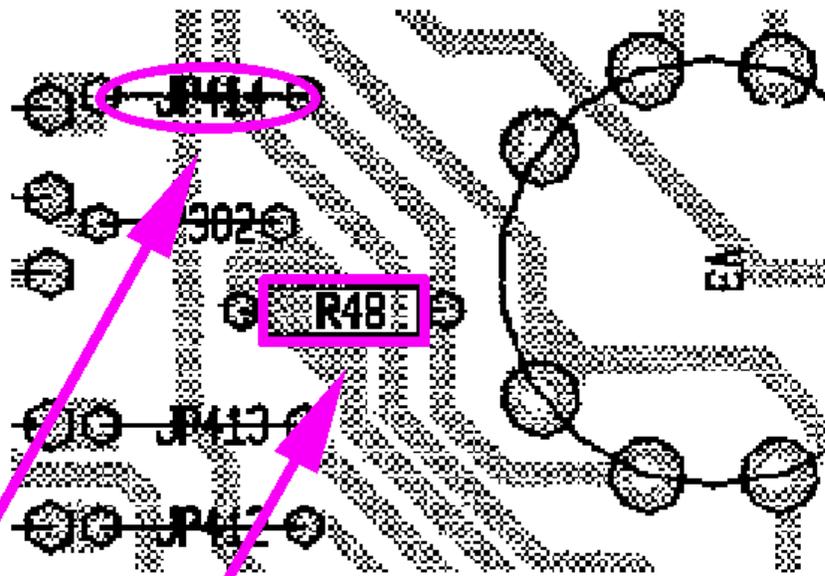
Diagrams for the Master Volume Mod:

Classic 30 Master Volume Mod V3 Overview



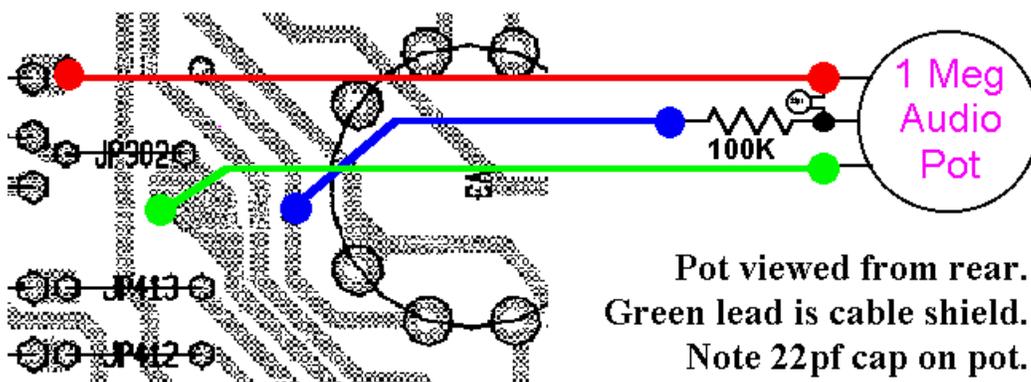
R48 & JP414 on Tube Board

Classic 30 Master Volume Mod V3 Detail



Remove R48 & JP414 on Tube Board

Peavy Classic 30: Master Volume Mod



Pot viewed from rear.
Green lead is cable shield.
Note 22pf cap on pot.

Tube Board near V3

General Information on mods for Classic 30

Warning! Tube amps have high voltages inside of them, even when the amp is unplugged! The large power supply filter capacitors can be safely discharged using a well insulated test probe connected to the chassis ground through a 10K resistor. With the chassis removed from the cabinet and the FX jacks to your left you will notice several large 5 and 1 watt resistors mounted on stand-offs away from the board. Directly above from the Bass control is R58; with the insulated 10k resistor/probe short first the left lead and then the right lead. Directly above from the Pre gain pot is R59 mounted horizontally and R60 mounted vertically. With your special resistor probe, short first the left and then the right leads of R59, and then first the back and the front leads of R60. Generally any charge will be drained through the OT (output transformer) after a minute or two, but its best not to take any chances.

To remove the Classic 30 from the cabinet to work on it, first unscrew the reverb spring bag and cable straps, unplug the speaker and reverb leads, and then remove the 8 shoulder screws on the top and sides of the cabinet holding the chassis. I generally label tubes with their socket numbers using a Sharpie marker before I pull them out so I know where to put them back; this also helps in lining them up properly so you don't bend the pins. In putting the tubes back into the Classic 30, the gap between pins 9 and 1 for the preamp tubes faces the front of the amp, and the gap for the output tubes faces the rear of the amp.

To remove the 3-sided circuit board from the chassis, remove the chicken head knobs and unscrew the 11/32" nuts holding down the 7 pots and 1/2" nuts securing the 5 jacks. Pull out the small jack board. Unplug the yellow and red wire harness from the power transformer as well as the yellow and blue speaker plug, two OT plugs (the lower OT plug is Blue-Red-Brown) and the reverb cable connector. Remove the 8 black screws holding in the circuit board with the tube sockets and then gently push in first the tube sockets and then the pots to remove the 3-sided circuit board from the chassis (it should be free to come out completely). As I remove different components from the board, I tape them to the inside of the chassis and label them with the reference numbers and value in the event I want to reinstall them later.

After taking the amp apart about a dozen times in developing these mods, I noticed that some of the pot bushings would not tighten down properly and that some of the chicken-head knobs were loose enough to rattle or slip. I found that teflon tape (for plumbing) works great for both of these problems; for the pot bushings wind a few wraps of the teflon tape clockwise around the bushing. For the loose knobs, fold over the tape so that it is about 4 layers thick and place it on the shaft before pushing the knob back on. If I am just making a quick test of a mod, I'll only replace maybe 3 of the pot nuts, and only tighten them down loosely. But be sure to tighten down the input and extension speaker jacks as these establish the grounds for the circuit board and power tubes.

A few other tips: label the bottom of the knobs with a Sharpie permanent marker when you first take them off. Although they are all supposed to be identical, they will slip on some pots but not others. After having one of the grounds break on a reverb tank plug, I put heat shrink tubing on both of the plugs to help protect the solder connections. After unfolding the circuit board a dozen times, I found the hinged jumper wires starting to break; be careful when you unfold them and if you notice any copper showing through that means the wire is ready to break- either replace it with 22 ga bus wire or you can try reinforcing it with a short length of 24 ga bus wire.

As for replacing components on a printed circuit board there are a few tricks I learned. Desoldering braid works better for small solder connections than a desoldering tool. Although you can get it at Radio Shack (#64-2090B), the Chem-Wik line carried at electronics parts houses uses a finer braid that is less abrasive to the board. Be sure to check all of the sections of the board you work on for solder bridges (which are short circuits between two traces). In the event that a solder trace breaks off when you are reworking the board you can reestablish the connection by bending the component lead over to where the trace had gone originally (check the layout drawing from Peavy). The bottom of the circuit board is covered with a protective coating; I'll polish a trace with the desolder braid and a dab of solder until the solder adheres to the trace where I intend to run the lead. One last note on soldering: be sure to use a damp sponge to keep the tip clean.

Notes on the Adobe Acrobat PDF Format

A few words on the PDF format: the latest version of the Acrobat Reader (4.0) is available for free at the Adobe site, along with the plug-ins for your browser (click on the icon at the bottom of this page to get the latest versions from Adobe). I personally find the stand-alone Reader to be a lot more versatile than the browser plug-ins so I usually save PDF files to disk and run the Reader off-line to view and print the documents. To save an on-line file to disk, right-click on the [link](#) to the file and choose the appropriate command for your browser ("Save Link to Disk" for NetScape).

There are several options for the Acrobat Reader that make PDF files more manageable. To access the options menu select **F**ile | **P**refer**e**nces | **G**eneral (or just hit <Ctrl><Shift> G). For "Default Magnification" I find "Fit Width" to be best for reading text documents and "Fit Visible" to be best for viewing schematics and drawings. Also be sure that the box labelled "Smooth Text and Monochrome Images" is checked. There are other options accessible through the **V**iew item on the menu bar. Near the bottom are three choices including Single Page and Continuous. "Continuous" retains page breaks but allows for smoother scrolling between pages; also, the "hand tool" will work across page breaks.

As always, if you have any questions, comments or suggestions, feel free to send me e-mail.

Good luck!

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(Revised 6/12/998)

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<http://www.blueguitar.org/>



Reference materials:

Peavey Classic 30 schematic:

<http://www.blueguitar.org/c30schem.gif> (116k)

Peavey Classic 30 layout drawing:

<http://www.blueguitar.org/c30layg1.jpg> (708k)

Peavey Classic 30 annotated schematic (1999 mods):

<http://www.blueguitar.org/c30schmd.pdf> (171k)

Peavey Classic 30 revised relay board mod:

<http://www.blueguitar.org/c30rlybd.pdf> (539k)

Peavey Classic 30 collection of earlier articles:

http://www.blueguitar.org/c30_mods.pdf (803k)