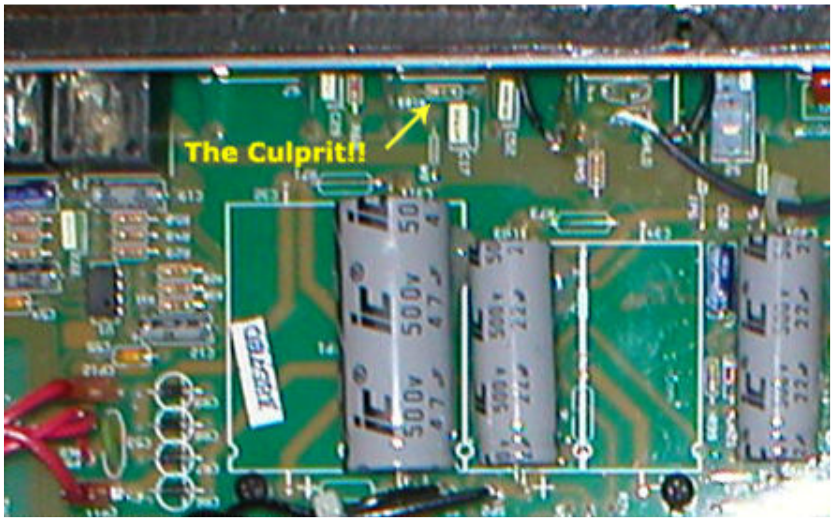
Hot Rod Deluxe/Deville Reverb Mods

The Steve Dallman Reverb Mod



This mod does NOT work with other amps like the Blues Deluxe/Deville.

Like all mods and fixes on this site, doing them will void your warranty. That means that if something breaks Fender will NOT pay for it—YOU will.

Now that I probably scared you all so bad that only the brave and crazy remain.. this is one EASY EASY EASY mod. I'd hate to say this one is "impossible" to screw up (because as soon as I say that someone will email me and tell me their amp doesn't work anymore), but lets say it's "less difficult" than other mods.

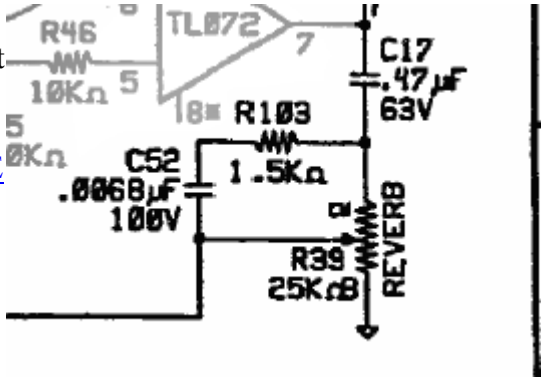
Before we begin I must give total credit to Steve Dallman for this mod as 100% of it was his idea. Thanks Steve.

The great thing about this mod is that all you need is a screwdriver and wire cutters. No soldering iron skills required! ahem.. that is.. unless you don't like the change, then you'll need some soldering iron skills. Okay, okay.. What does this mod do?

Lets face it, as bombastic as the Hot Rod's reverb is, who wants to gig with it anywhere above 3? It really just swamps your signal, in my opinion. The Steve Dallman Mod removes the treble bypass from the HRD's circuit, which it really doesn't need. The bypass is made up of C52 and R103, which allow more treble (and signal) to bleed through when the knob is turned at low volumes. This will have a two part effect. It'll one: make the reverb control less touchy, and two: remove the treble boost at low volumes—this has been described as making the reverb sound "fuller" and "less transistory" by other owners. In my opinion, the change isn't dramatic, but it's there. Note that when the reverb is turned to higher volumes there will be no change in tone.

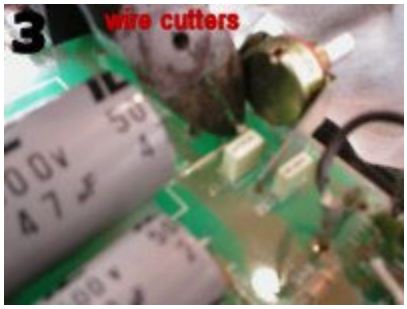
So how do we remove the treble bypass?

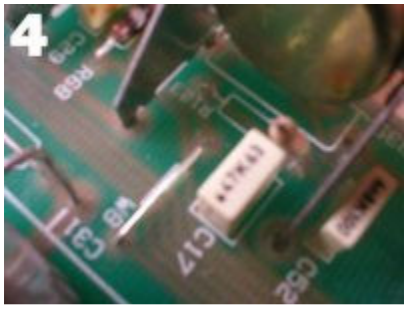
1. **Drain the Caps and unplug your amp!**
Safety first! Did you see those big grey caps that say 500v on them? Yep, they can kill you. If you don't know how to drain those capacitors, then it's important that you learn! CLICK HERE TO LEARN!



2. Unscrew the back panel.

3. Find R103 and C52—they're right behind the reverb pot. Clip one of them. The resistor is much easier to replace if you don't like the change, not to mention easier to clip. Just get your wire cutters and clip one (or both) of its leads. The fact is, once the circuit is broken no electrons will travel through the treble bypass. You can either totally remove it, or break the circuit by clipping one of the resistor's leads.

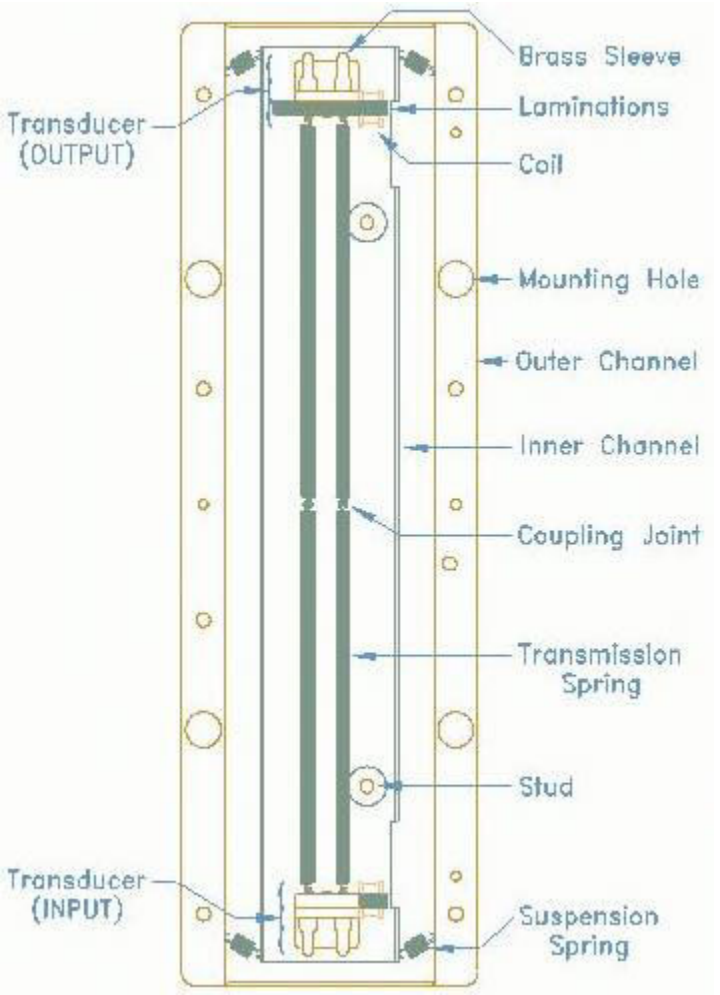




4. It'd be a good idea to bend the resistor so it doesn't short on anything, or recomplete the circuit—that is, if you don't want to totally remove it. I have mine propped up against a capacitor. To me this seems to be the best place. Be sure that the resistor doesn't touch those "wings" that secure all the pots onto the PCB. They are grounded, and if the resistor touches it the reverb signal will be sent straight to ground. If you find that you can't hear any reverb after doing this mod, then there's a 99.999% chance that this is your problem!

5. Put the back panel back on, and enjoy the mod!

The 3-Spring Reverb Mod



There's a certain gentleman on ebay whose been selling 3-spring reverb tanks for ridiculously high prices IMO. Note that I have no personal vendetta with this person, but I've been asked about his products, and I think he's misleading his fellow musicians (and Hot Rod owners). What follows is my take on the matter, as well as another source to get the same tanks.

Despite any initial opinions of the picture on the right, reverb tanks are actually very simple. As you can see, there are transducers on both ends of the tank. One transducer pulls on the spring when electrical current passes through it, and the other converts the movement of the spring back into electrical current. It is then reamplified and sent back into the guitar amplifier, where it is remixed with the original signal via the "Reverb" control. Because a spring is used, a mechanical delay is created, and the spring will bounce around until it comes to a rest. Likewise, sound waves will bounce around in a room until they come to a rest. This is perceived as reverberation, and how the circuit simulates acoustic reverb.

Let's take a look at some of the things ebay dude has said, and then I'll rebuke him with my big fat opinion stick.

"The reverb tank I am selling is a new Accutronics tank that I personally modify to reinforce some of the delicate connections. So you can't even buy one like this somewhere else."

If anyone wanted to 'reinforce' these so-called 'delicate connections,' all one would need to do is touch up any, and all, soldered joints. That's it. There really isn't much going on under the hood of the tank to improve. Furthermore, I have not heard of anyone having any problems, ever, with the springs or transducers in their tank coming undone. I can not see why this so-called 'reinforcement' is necessary, or why it makes his tanks worth double the normal cost.

"What does a 3-spring tank sound like? Fender reverb has always been good but the improved reverb tank takes it too a higher level. The reverb is richer and has more of the note you are playing in it and less of the staticky/crashing noise of the stock reverb tank."

Bullocks! That's simply an opinion—I know plenty of people who prefer the 2-spring over the 3-spring in their amps. (See link to FDP discussion further down the page.) I

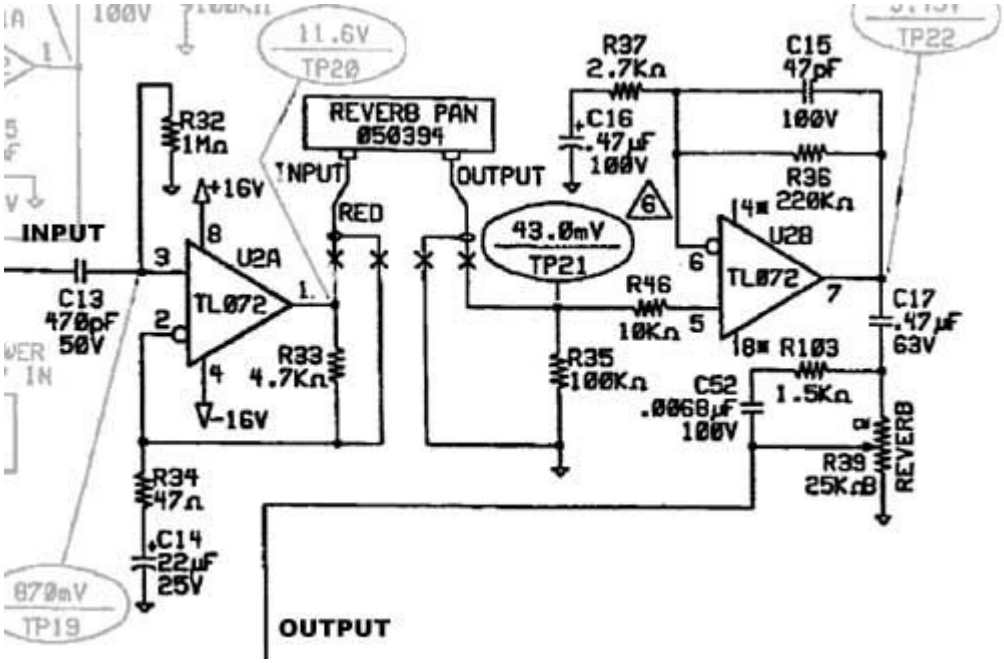
think if you find that the stock reverb is already "too much" for you, you'll likely find that a 3-spring tank only makes things worse.

Rest assured that Fender did not cut corners on the reverb tank. FMIC has put the classic Accutronics "2 spring" with the "long delay" in the Hot Rod Deluxe/Deville—this is the same type of reverb tank that Fender has always used in their best amps. The only difference is the input impedance is made to match the solid state reverb driver, which is 600 ohms, instead of the 8 ohm transformer-coupled tube driver in the old amps. (Adding all tube reverb would have broke the budget.)

"The tanks also come in two different delay or dwell times-medium or long. I prefer medium delay for most musical styles and faster playing. If you only use reverb for ballads or would just like to be awash in "surf" style reverb choose the long delay."
The 3-spring with the medium delay time is the R9EB2C1B, and the one with a long delay is R9EB3C1B. Note: the only difference being the fifth character, which signifies delay time. You can order the tank with the medium delay from AES, just search for part # **P-R9EB2C1B**. It normally costs $23.95, and IMO there's no real reason to pay $45 for questionable 'improvements.' Why fix it if it ain't broken? Save your money.

The 2-spring with a medium delay is also available from AES—part # **P-R4EB2C1B** for $21.95. Buy this one if you just want less reverb.

Hot Rod Reverb Circuit Explained



It's well known that the Hot Rod uses TL072 opamps, but how is the reverb implemented? The reverb driver opamp is a "current driver." This simulates the old transformer coupled tube circuits much better than other voltage driven opamp circuits.

For a solid state driver this is a very good design for the cost to emulate a classic Fender reverb sound.

C13 and R32 is a high pass filter that's used in all reverb units. It cuts bass because natural reverb is more prone to the mid/high frequencies. The classic Fender reverb high pass filter is 560/1MΩ, but the Hot Rod uses a 470/1MΩ filter to cut a little more lows since this amp is very bass heavy.

Next is the TL072 opamp. The input voltage is recreated across R34, and it looks like C14 also cuts some low end. The output current is set by the equation Vin/R34, so if the reverb is too "over the top" you can reduce the output by half by increasing R34 to 100Ω. If you want twice as much reverb try decreasing the value of R34 to 22Ω. I tried the latter because I was trying to get a surfy "splash" or "drip," but found that it only made the reverb sound harsher. R33, the 4.7KΩ resistor, has no influence on the circuit. It's job is to isolate the reverb input transducer from ground. Don't mess with it.

The reverb pan itself is model 4EB3C1B, but what does this mean? The first digit indicates that it's a "Type 4" reverb pan. Accutronics' site says that the Type 4 reverb pan is, "the industry standard for years, the Type 4 is still manufactured today using Hammond's original design. Four counter wound and coupled springs deliver superior mechanical performance and the classic sound that helped make the Fender Twin Reverb Amps famous." The E indicates an input impedance of 600 ohms, and the B indicates an output impedance of 2,250 ohms. The 3 indicates that the decay time is LONG, which is between 2.75 and 4.0 seconds, and the C tells us that the input is insulated and the output is grounded. The 1 tells us the tank does not have a locking device, and the B tells us pan mounts horizontally with the open side down. I got this information from the Accutronics website if you're interested.

Note that the standard/classic Fender all tube reverb pan, the 4AB3C1B, only differs from this pan by input impedance. This is done to compensate for impedance differences between the opamp and the actual transformer coupled reverb circuit. So if you've realized that you can't just stick any reverb pan in here you're correct! Rest assured that Fender has made strides to get the best reverb sound they could and still bring the price down to a level the working man could pay.

The reverb recovery opamp is also simpler than it looks. It's the standard non-inverting opamp circuit. A high frequency roll off is created by C15/R36. This is cuts off frequencies above 15KHz. A low frequency contour is created by C16/R37, which is set at 1KHz. The gain of the output stage is also created by R36 and R37, so you need not mess with anything here. R35, the 100KΩ load resistor, can be experimented with as it controls output. A 220KΩ resistor will give more gain, while a 47KΩ resistor will give less gain. I'm guessing R46 is there to control blocking distortion, so don't mess with it.

Finally we reach the reverb's volume/mix controls. C17/R39 recreates a high pass filter for all frequencies above 135Hz. Around the mix control is a treble bypass (C52, R103) which boosts high frequencies at low mix settings. Since the reverb is a little "over-the-

top" anyway it can easily be removed to give the reverb a more "natural" sound at low mix settings. This is what Steve Dallman does in his "Reverb Mod."

In closing, there really isn't as much to this circuit as we initially thought. One may even argue that it's simpler than the classic Fender tube reverb. If your Hot Rod's reverb is "too much" or "too little" it can be tweaked by swapping out different value resistors for R34 or R35.

REFERENCE: K. O'Connor, "Solid State Reverb Drivers," "Solid State Reverb Returns," The Ultimate Tone: Modifying and Custom Building Tube Guitar Amps, pg. 8-10 & 8-14

By Justin Holton

Source and Special thanks: Steve Dallman