

The Blue Guitar

Custom Tele Harness

Overview

I had put SD vintage stacks in one of my teles a few years ago and was never really knocked out by the way it sounded so I decided it was time to try somethig new. I'd read reviews of various tele pickups over at Harmony Central and decided to try out a set of SD Antiquities, figuring I'd bring them back for a refund or exchange if I didn't like them. Along with the pickups, I got a special 4-way tele switch that adds a series linkage to the 3 normal positions. I've always liked the out-of-phase sounds from a Tele so I used a 500k push-pull pot with the switch wired up to reverse the phase of the neck pickup. I've been using TBX controls on all of my guitars whenever feasible so that is what I used for the tone control, but with a 0.05uF cap instead of the stock 0.015uF cap. (Teles can get really bright so I like to use a big tone cap on them.) Incidentally, after doing the math on the TBX controls, I think that they load the circuit down less in the center detent position if you use a 500k volume control. While my tele was apart to rewire the harness, I decided to shield the cavities with copper foil tape and to also redesign the grounds and signal returns following the principles developed by John Atcheley.

The Details

Starting with the pickups themselves, I added ground wires to both of the Antiquities so that the signal returns from the coils could be isolated from the grounds of the pickup cover (neck) and pickup plate (bridge). Even if you skip the John Atcheley tricks, the neck pickup needs a separate ground lead for the series linkage and the phase switch. I'd read reports that the Antiquity tele bridge pickup tends to be microphonic so I repotted both pickups in a double boiler full of paraffin for an hour. Although I usually shield single coil pickups with copper foil tape, I skipped that step on this project. To reduce noise, twist the three leads from each pickup together tightly. Since the cavities were shielded with copper foil tape, I did not replace the pickup leads with shielded cable (which can shunt some of the high frequencies to ground by the capacitance between the conductors and the shield— typically 20pF per foot or higher).

In lining all of the cavities with copper foil tape I reinforce all of the corners with a thick layer of solder. I also glued aluminum foil to the back of the pickguard with rubber cement and ran a short length of the copper foil tape out of the control compartment and onto the top of the body so that the aluminum foil would be connected to ground.

In wiring up the push-pull volume pot, I added a network of a 180pF mica cap and a 220k resistor across the ungrounded terminals of the pot; the cap helps retain high frequencies as you turn the volume control down and the resistor smooths out the taper a bit so that you have more control over the very critical higher volume settings. (I did the math on the added resistor; when set to "8" it is equivalent to "9" on a non-modified pot

and so on down the line.) The second drawing below shows how to add the cap and resistor between the wiper of the pot and two terminals of the switch section that are connected to the cw terminal of the pot. By mounting the cap and resistor as shown, you can go back and very easily change the values later; there is not a lot of room to mount them on the pot section and if you do manage to squeeze them in, it's a real pain to remove them later.

The drawings illustrate the John Atcheley method of isolating the signal returns from the various grounds on the guitar (cable shields, pot cases, control plate, shielded cavities and bridge plate). The idea is to run all of the signal returns from the pickups and controls to a single point, which is then connected to the ground lug on the 1/4" output jack. The signal returns here all connect to the ccw terminal of the push-pull volume pot. The various grounds are isolated from this terminal with a 2.2uF mylar cap which is grounded under the screw that mounts the 4-way selector switch. By isolating the signal returns from the "chassis" grounds (no chassis on a guitar, but you get the idea) the guitar is quieter and safer to use, with less of an electrocution hazard when touching the strings. However, be advised that the metal barrel of the guitar cable plug is still connected to the chassis ground of your amp so you may want to add 2 layers of heat shrink tubing over the barrel of the plug for added safety.

In wiring up guitar wiring harnesses I use 22 ga and 24 ga tinned bus wire with colored 1/16" heat shrink tubing to help identify the leads. With the bus wire you can add in all of the jumpers on various switches and pots with a single wire, which is not as easy to do if you start off with insulated wire. Whenever possible, I alternately use component leads as jumpers or wires, with the colored heat shrink tubing for insulation and identification. One other trick with heat shrink tubing: I always slip a short length over the inner conductors of shielded cable to help ensure that they don't get shorted out to the cable shield when soldering (or desoldering!) the cable; the clear heat shrink tubing works well for multi-conductor cable as you can see the original color of the leads.

Good luck!

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<http://www.techaccessinc.com/blueguitar>

http://www.techaccessinc.com/blueguitar/tele_mod.pdf

Telecaster Wiring Harness

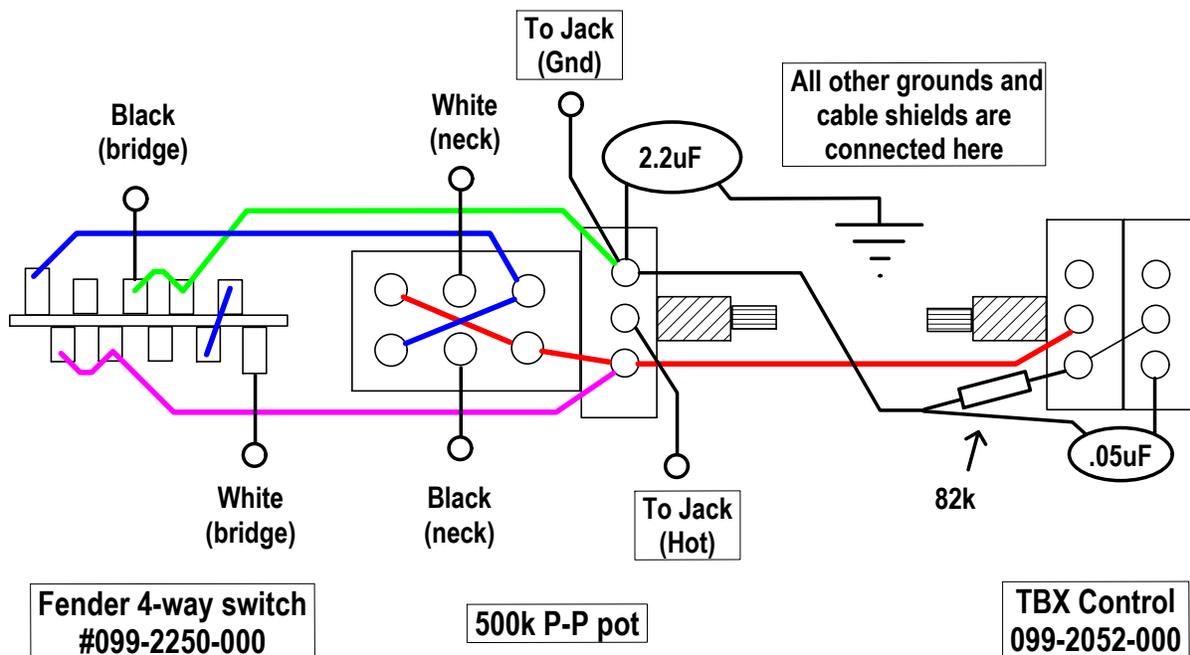


Figure 1: 180pF cap and 220k resistor not shown here

Telecaster Wiring Harness

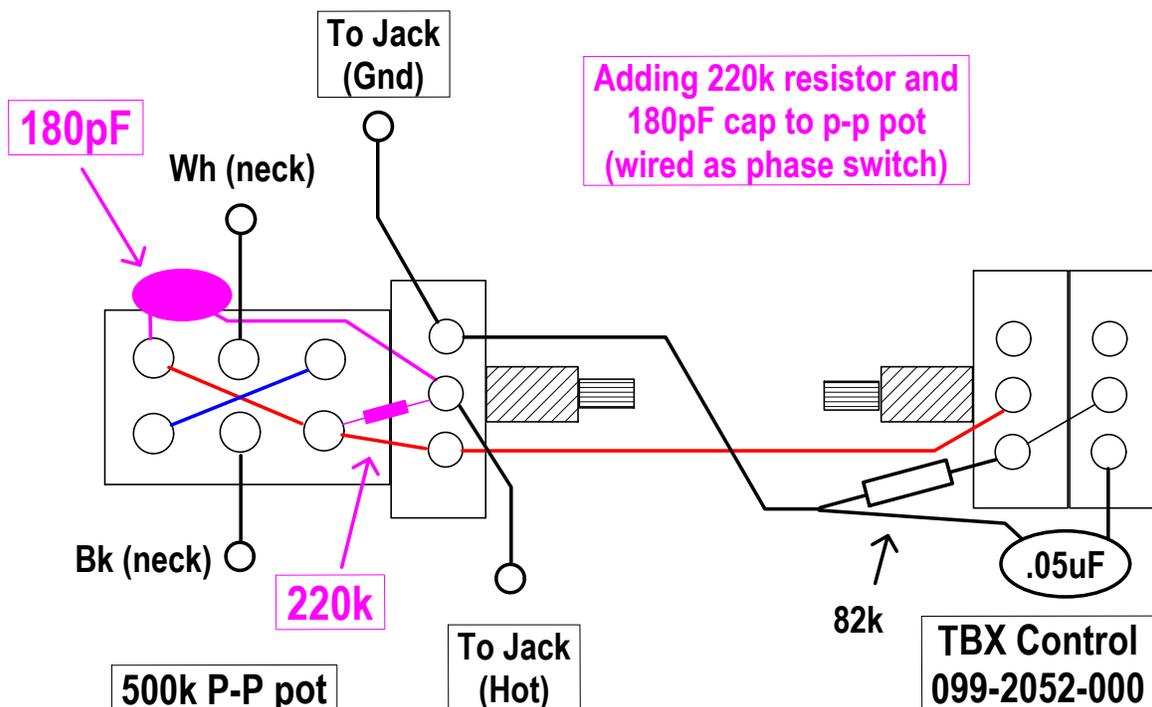
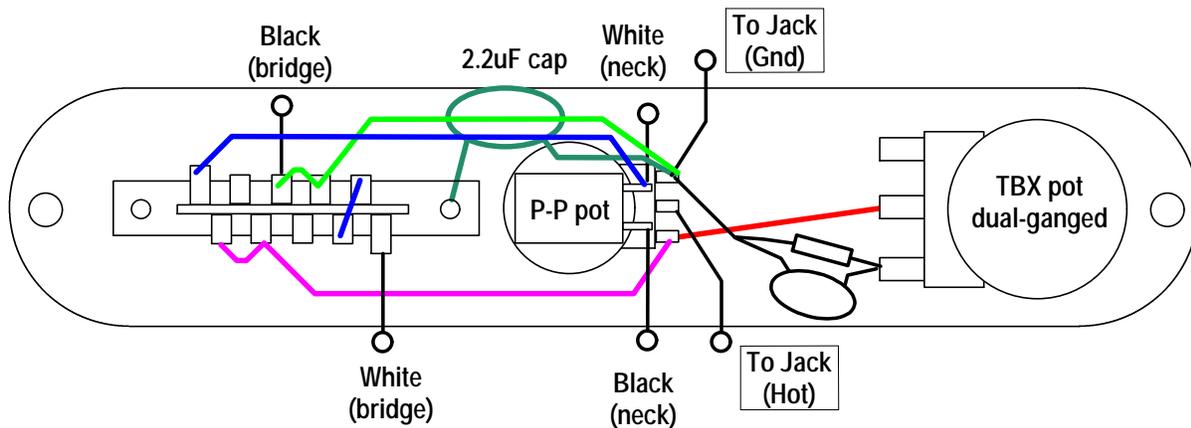


Figure 2: Detailed view showing 180pF cap and 220k resistor

Telecaster Wiring Harness



Pictorial View (many leads omitted)

Figure 3: This drawing shows general location of components

Parts List:

Fender part # 099-2250-000 (4-way selector switch)

Fender part # 099-2052-000 (TBX control)

500kA push-pull pot

0.05uF cap for TBX

180pF cap for volume pot

220k resistor for volume pot

2.2uF mylar cap