

GuitarPCB.com Presents...



## Pump'd Up Rangemaster Plus – v4, v3, and v2.

This is our revision of a vintage favorite! We have studied many versions of this classic circuit, and gave it the royal GuitarPCB.com treatment. Included in this version is a charge pump, which allows you to use a vintage **PNP** transistor and still share power with your other standard negative-ground pedals. Using a Charge Pump has no effect on tone.

The original Rangemaster was a treble booster. This build incorporates **3 different tonal selections**. The first will give you a classic Rangemaster treble boost. The second setting boosts highs and mids. The third setting boosts the full tonal range of a guitar, or “band pass” setting. The 3 tonal selections are made with a small SPDT On-Off-On switch.

### Notes on this build:

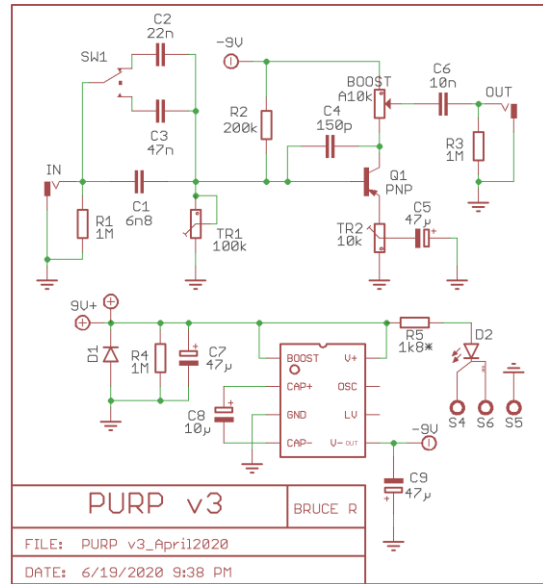
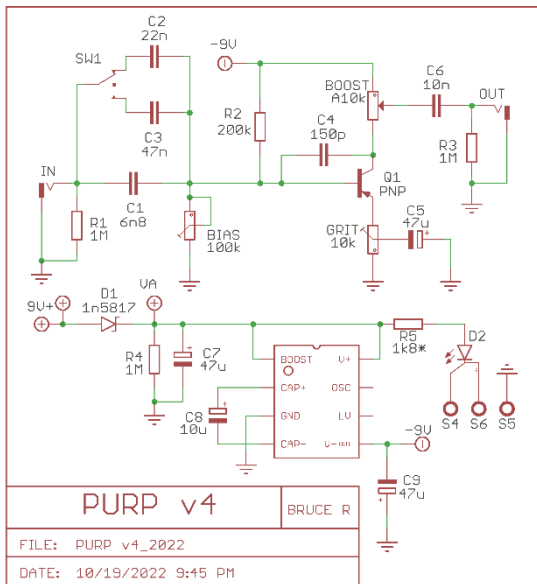
- **New v4 uses the 1N5817.**
- You will need to bias this circuit. With the transistor in, and a good 9V power supply attached (no half-dead batteries allowed) use a Digital Multimeter (DMM) to measure between ground and the collector of Q1. The layout shows which pins are which. Turn the BIAS trimmer until the collector voltage is negative 6.8-7.8 V (assuming you have the red test lead on the collector, black on ground)
- To adjust the TR2 'GRIT' trimmer properly, turn TR1 all the way up. The further clockwise you turn it, the louder and more of an overdriven sound you will get. Once you have it hooked to your amp, you may want to adjust it back up by 5-15% to suit your tonal preferences.
- The input capacitors (C1, C2, and C3) are what control the tonal balance. When the switch is in the middle (OFF position), only C1 is active. Flip the switch to activate C2, and C1 and C2 are active. Flip the other way to activate C3, and both C1 and C3 are active.
- The gain of your PNP transistor should be between 70 and 140 hFE, and low leakage as possible. Many Silicon PNP transistors sound fantastic, have no leakage and are very stable.
- **C4** is a hiss filter. Any value between 150p and 470p should do. This will not interfere with the guitar tone as it is too high of a filter even at 470p. Since it will not affect the tone, use what you have. If you need a higher filter add one in parallel.

**The Charge Pump is not part of the audio path and will not affect the tone.** The purpose is to reverse the polarity outside the “audio path” allowing you to incorporate a PNP circuit into your regular pedal chain with ease. If you hear a whining tone be sure that you have a proper CPAZ charge pump. C4 hiss filter will not help a bad charge pump.

For a deep analysis of why this is the best available Rangemaster circuit today read the [Analysis of the PURP](#) by Big O

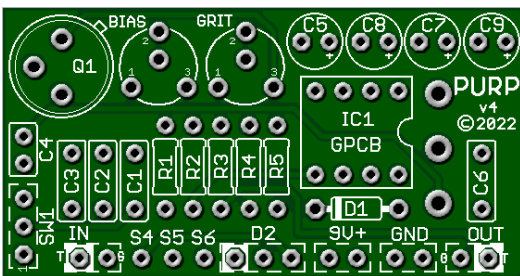
| Part | Value                        |
|------|------------------------------|
| D1   | V2, v3, 1n4001 – v4 = 1N5817 |
| R1   | 1M                           |
| R2   | 200k                         |
| R3   | 1M                           |
| R4   | 1M                           |
| C1   | 6n8                          |
| C2   | 22n                          |
| C3   | 47n                          |
| C4   | *150p - 470p                 |
| C5   | 47u                          |

| Part       | Value          |
|------------|----------------|
| C6         | 10n            |
| C7         | 47u            |
| C8         | 10u            |
| C9         | 47u            |
| IC1        | 7660S          |
| TR1 - BIAS | 100k           |
| TR2 - GRIT | 10k            |
| P1 - LEVEL | A10k           |
| SW1 - TONE | SPDT_ON-OFF-ON |
| Q1         | PNP 70-140 hFE |

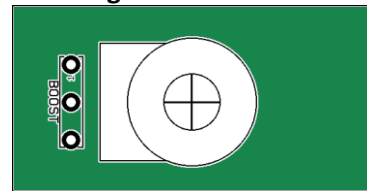


This document will cover v4, v3, and the previous v2.1. All components will be populated in the same manner using the same BOM and schematic regardless of version. Note that v4 the D1 protection diode (1N5817) reverses its orientation.

**New v4 reverses the orientation of the D1 diode. Always follow the board silkscreen.**



**Actual size 300 ppi drill template  
 Showing the BACK SIDE of PCB:**

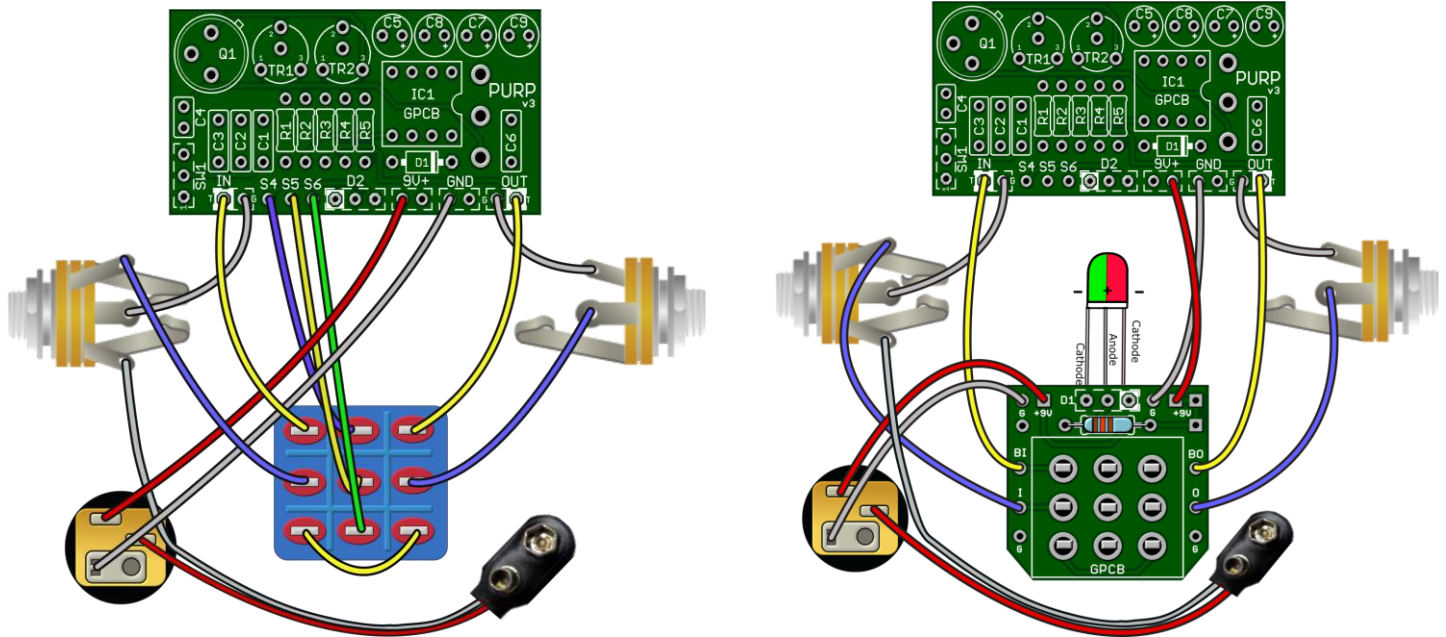


PCB Size: 1.875 x .975 Inches (47.6 x 24.8 mm)

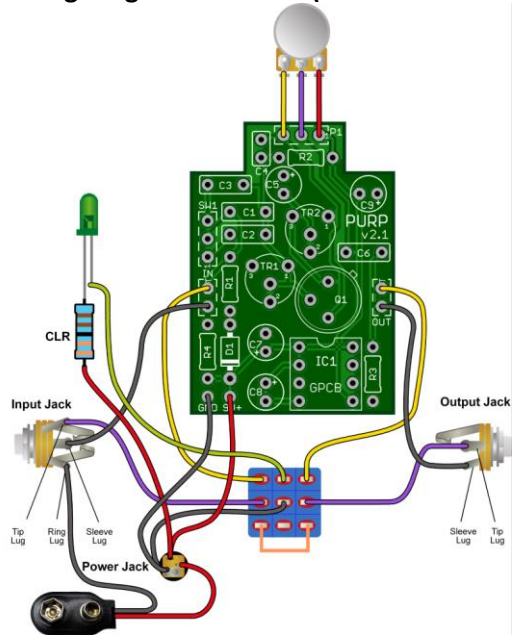


You can also cut out and use this switch on your drill template. Size is approximately 12.5 x 7.5mm, matching many mini-toggle models:

**Wiring Diagram v3 and v4 versions:**

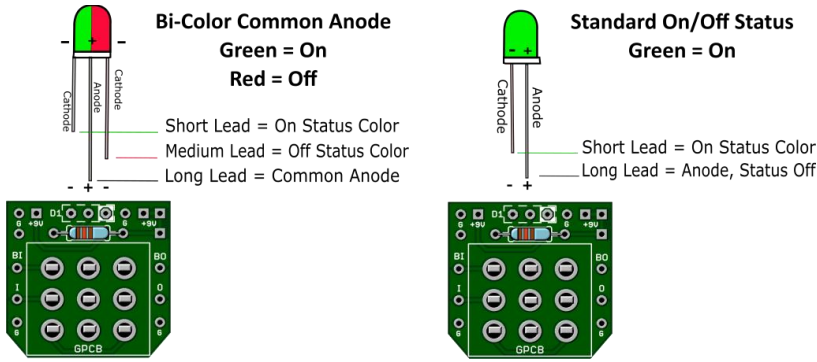


**Wiring Diagram Pre-2020 (note no D2 or R5)**



Be sure your In/Out Jack wiring is correct. A Stereo Jack (for battery use only) has a RING lug which is used to connect to the battery ground. If you do not intend to use a battery there is no need for a Stereo Jack. If using Stereo then only use the Tip and Sleeve lugs. S4, S5 & S6 is only needed when the LED is wired to the Main Board.

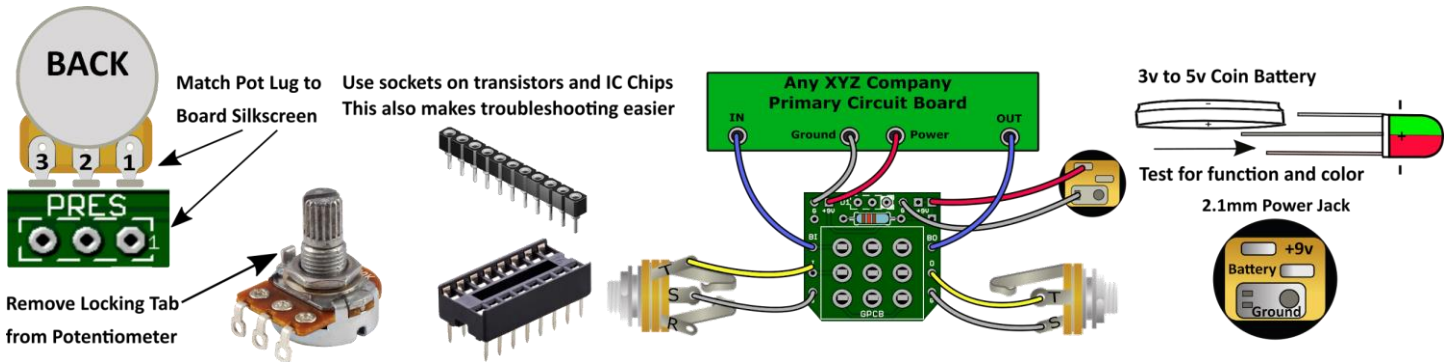
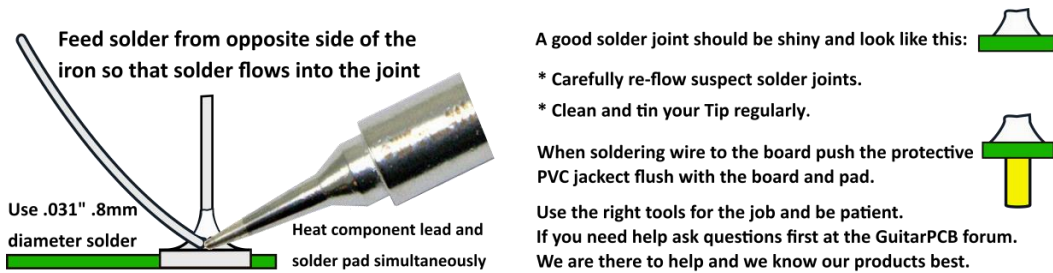
If using our convenient 3PDT Wiring Boards (below) here is an LED wiring guide. You may use Common Anode Bi-Color or Standard On/Off. The wiring boards use the same symmetrical layout as if wiring straight to the switch.



**Note:** If wiring the LED to our 3PDT board no need to connect S4, S5 & S6 or populate D2 or R5 (CLR) on the main board since you are wiring your LED directly to our board.

**Direct Online Link:** [3PDT Wiring Board Build Document](#)

**Drill Tips:** Measure your components before selecting a drill bit. We recommend drilling the pot holes, mounting the pots in the enclosure, and then soldering the pots to the board. This approach should resolve the issue of the pots not fitting through the holes after soldering. We also recommend you make the holes for the pots a little larger than the threads in case you decide to remove the board and put it back in during the build, to avoid problems. Use this guide at your own risk. Make sure page scaling is turned off when you print this PDF, or the image above may be smaller than expected. Verify everything before drilling.



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