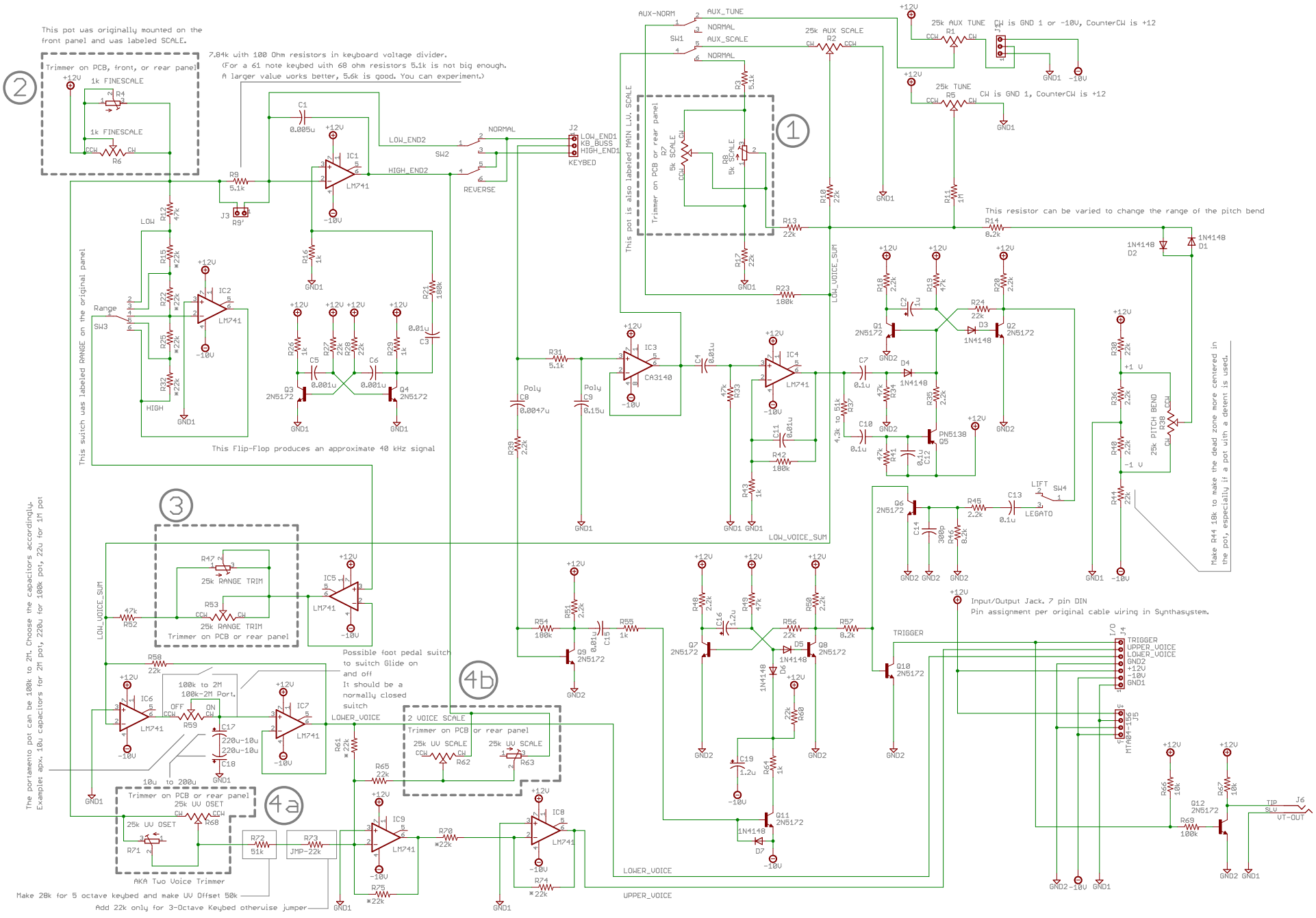

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IMPORTANT NOTE!

1. The keyboard uses two isolated grounds which should only be joined at the power supply mains. Do not connect these two grounds on the PCB.
   Run two separate gound wires back to your distribution location or better, at the output of the power supply itself.
   Be sure you don't connect the two grounds on the I/O jacks, panel, or other locations. GND1 is the Analog or signal ground. GND2 is the Trigger Ground.
3. The resistors on the keybed buss can be 1% (or even 5% per Nyle's experience).
4. The 22k resistors in the octave switch and in the upper voice output stage should be 0.1% (0.01% if available) or better.
5. The portamento shows a 100k pot and two 10uF capacitors. This combination give an almost imperceptible glide. Other documentaion shows a 2M pot instead of the 100k.
   10u capacitors work with a 2M pot. For a 100k pot, 220u are OK. For a 1M pot, 22u are OK. Choose ones which work well for you.
6. R14, 8.2k can be varied to adjust the span of the pitch bend. 8.2k gives about 1 octave span.
7. R37 can be adjusted between 4.3k and 55k (I used a 22k) to eliminate unwanted retriggering when a low key is held down and a key in the highest octave is also pressed.

If you want to use a 5 octave or bigger keybed, make the following modifications:

1. Make R9 bigger, 5.6k is good for 5 octave.
2. Make the UV Offset pot a 50k pot and make R71 a 28k. I tried a 28k and 30k and they both are fine. Just like you need to make the input resistance bigger for a shorter keybed, you need to make the input resistance less for a longer keybed.
3. I don t think this is neessary, but you can make the UV Scale pot a 50k and R65 a small value, 120 ohms or something like that. This give a wider gain adjustment for the UV Scale contribution.

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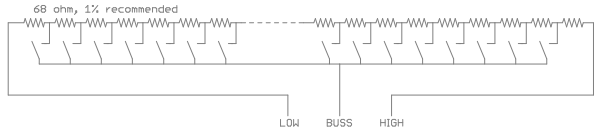

Suitches can be a Pratt-Read type keybed, or reed relays, push button suitches, resistor type ribbon controller, pot, etc. 100 ohm resistors can be used, but 68 ohm work best especially with a 5 octave keyboard

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TUNING PROCEDURE

1. Adjust the Main Lower Voice Scale for a zero shift in the upper voice output voltage when a lower key is pressed and released repeatedly while holding the upper key.
   (You many need to adjust the Upper Voice Offset first to get the upper voice into a reasonable range to start)
2. Adjust the the front panel Scale (AKA Fine Scale) for octave intervals from the lower voice output with the Range switch in the middle or Tune position.
3. With the keyboard scale in proper adjustment, adjust the Octave/Range Trim so that the Octave/Range switch shifts the pitch in one octave intervals (you can do this last if you want).
4. Adjust Upper Voice Offset (AKA Two Voice Trimmer) and Upper Voice Scale with one key pressed so that the upper key output voltage is the same as the lower key output voltage.
   The Upper Voice Offset and Scale are adjusted in concert to make the upper voice track the lower voice. This may require some iteration in adjusting.
   4a. Adjust the Upper Voice Offset (AKA Two Voice Trimmer) so that the upper voice and lower voice output the same voltage when a low note is pressed.
   4b. Adjust the Upper Voice Scale so that the lower voice and upper voice output the same voltage when a high note is pressed.
   4c. Repeate "a" and "b" until the lower and upper voice track over the entire keyboard range.

Additional tuning notes

5. I found there is an interaction between the UV Scale and LV Scale trimmers. After calibrating, check steps 1 and 2. If you have to turn the Finescale knob close to fully CW or CCW to get a double in pitch per octave turn the Finescale to approximately mid-point then adujst the LV Scale trimmer to get a doubling in frequency per octave.
6. Nou, adjust the UV Scale so that the upper voice does not shift when a lower note is pressed.
7. Next, go back and make sure the double frequency per octave is still calibrated. Go to step 3 again and set the UV Offset and check the UV Scale.
8. Re-check the LV Scale and Finescale and call it good.

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