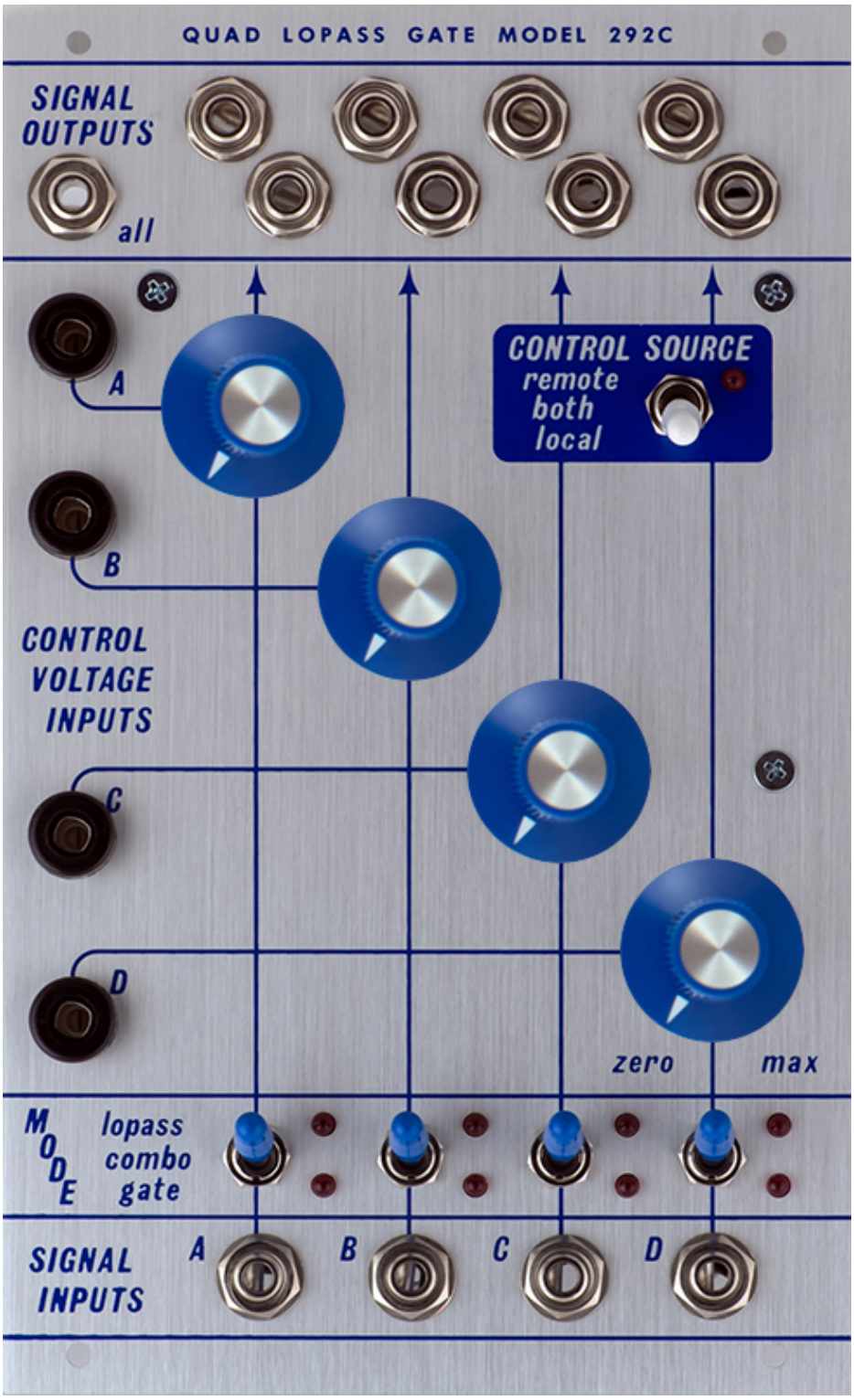
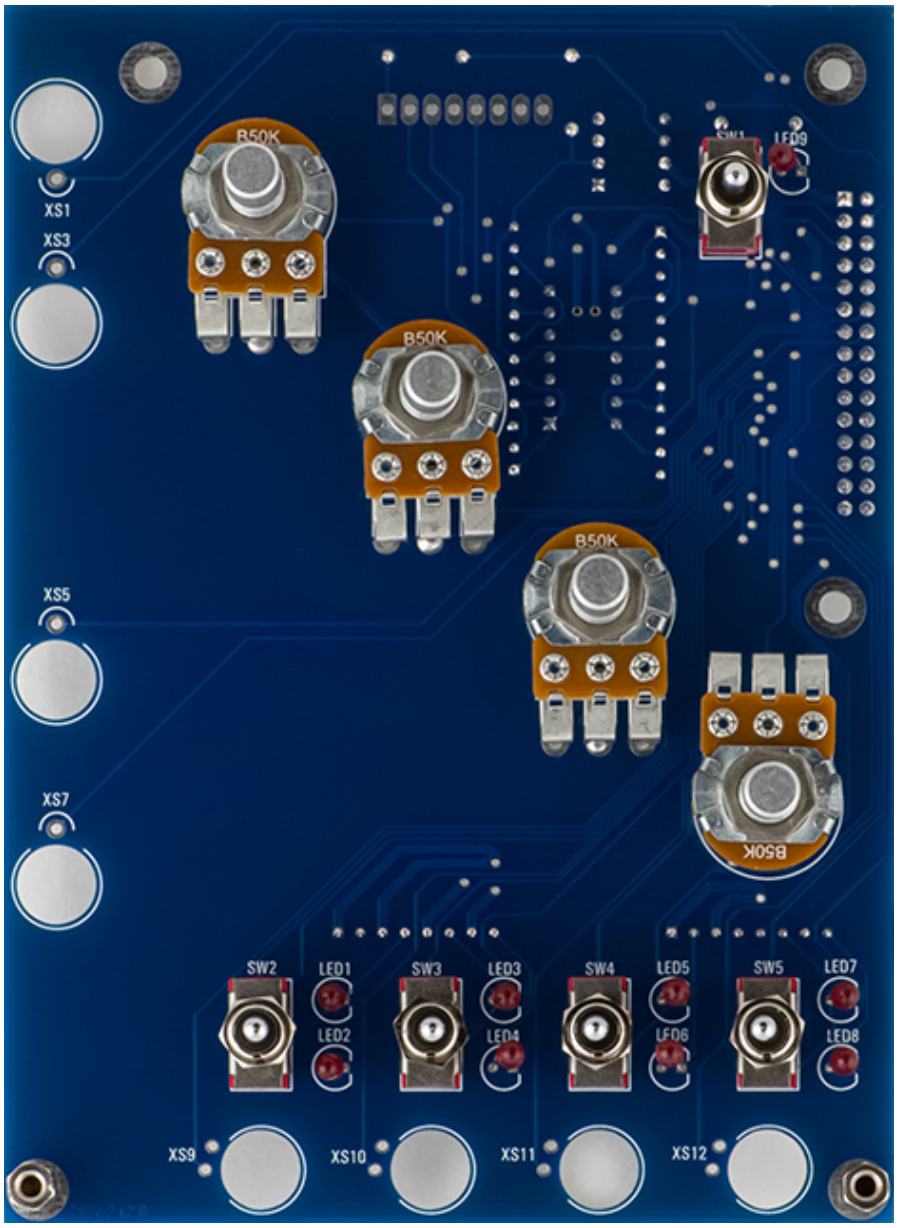
Buchla 292C Quad Low Pass Gate Module

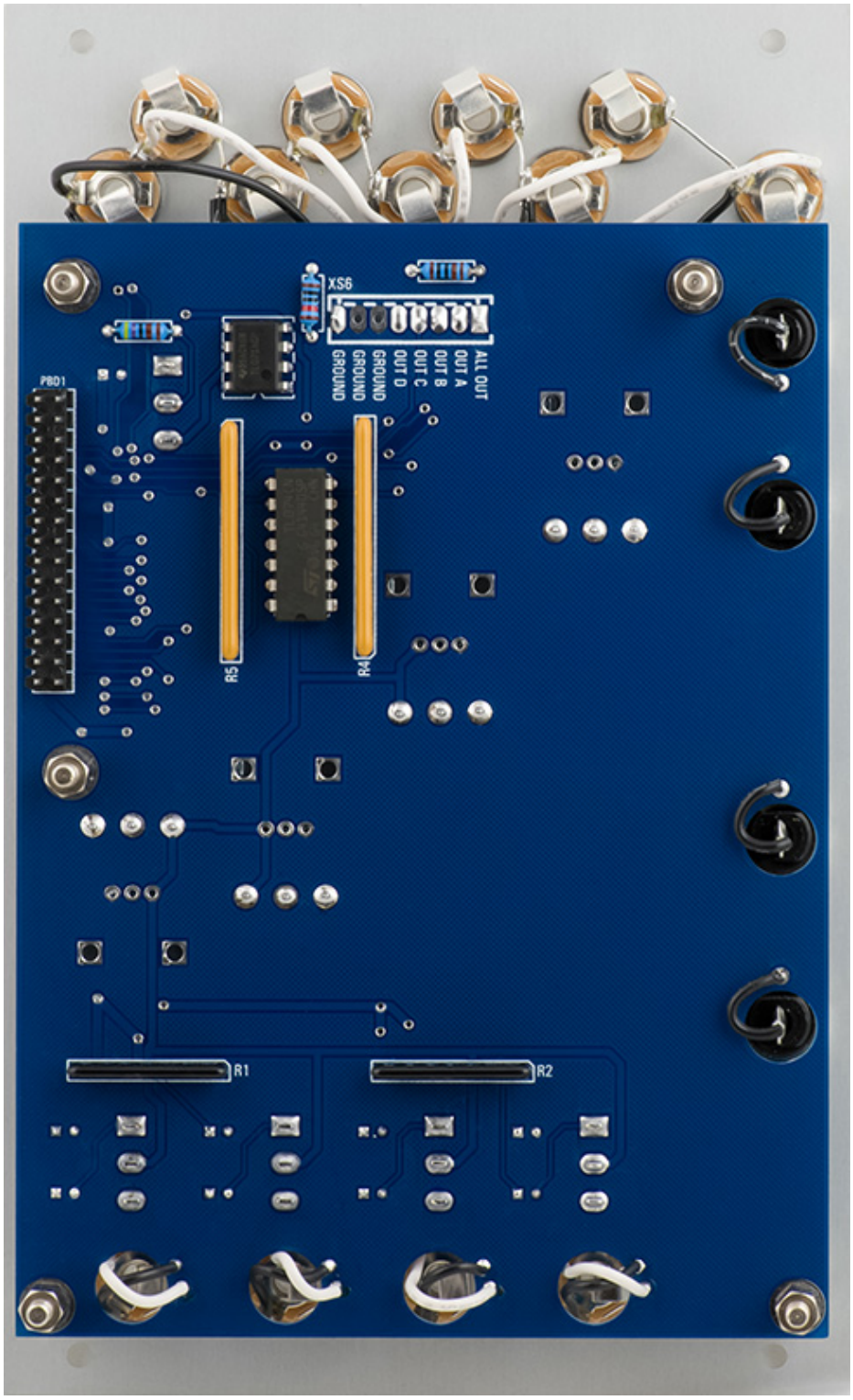
I built a Buchla 292C Quad Low Pass Gate module for someone else. They sent me a complete kit of parts and I assembled and tested the module. Many of the components are sourced through Mouser but specialized parts, panel, and knobs have specific sourcing and I do not know the details.



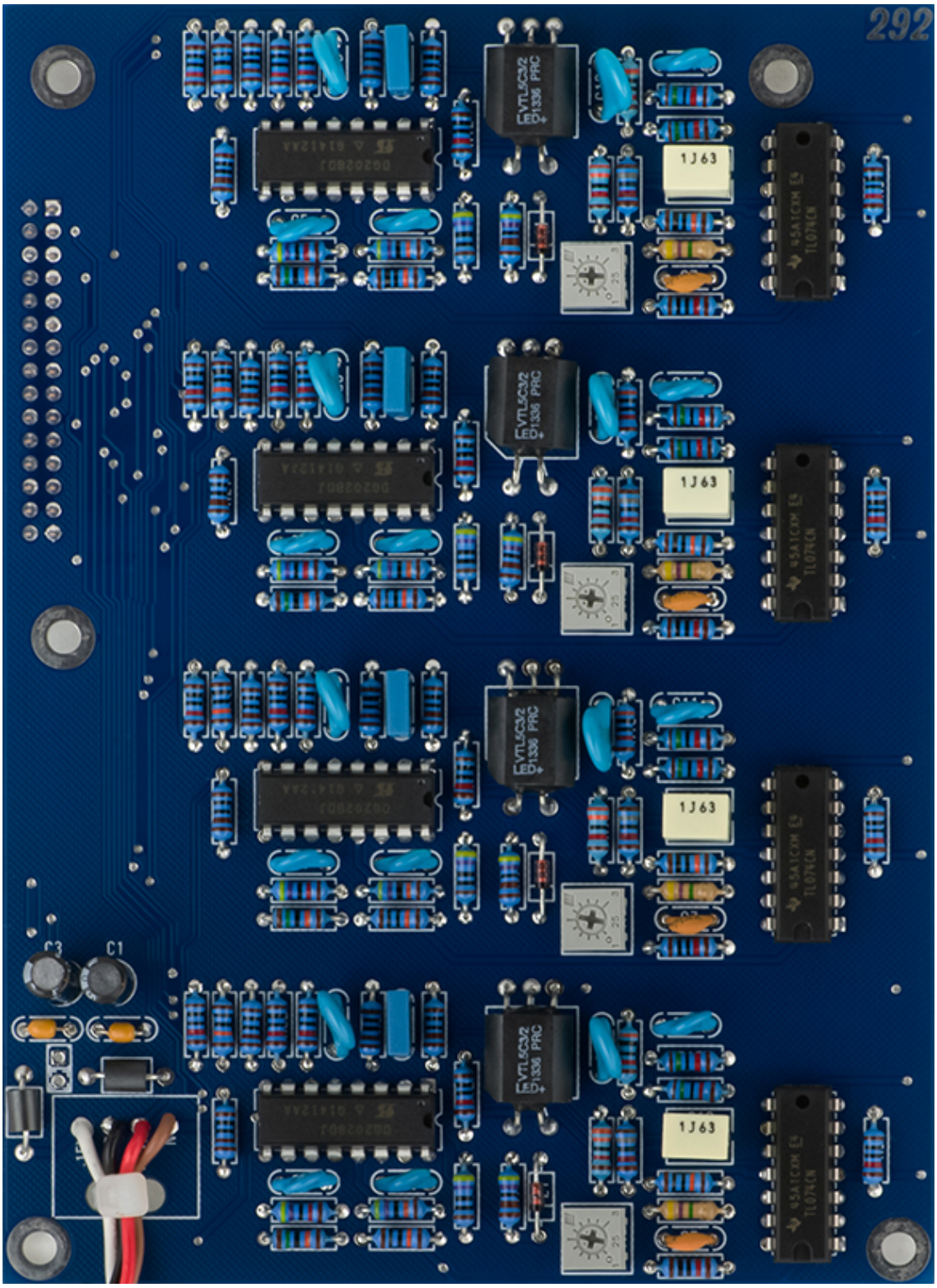
Assembly of PCB2 is straight forward. As with all these modules that interconnect with square pins, I fully seat the pins into the housing, mate the two PCBs together, then solder the pins. The square pin header sits off the board but the pins fully mate.



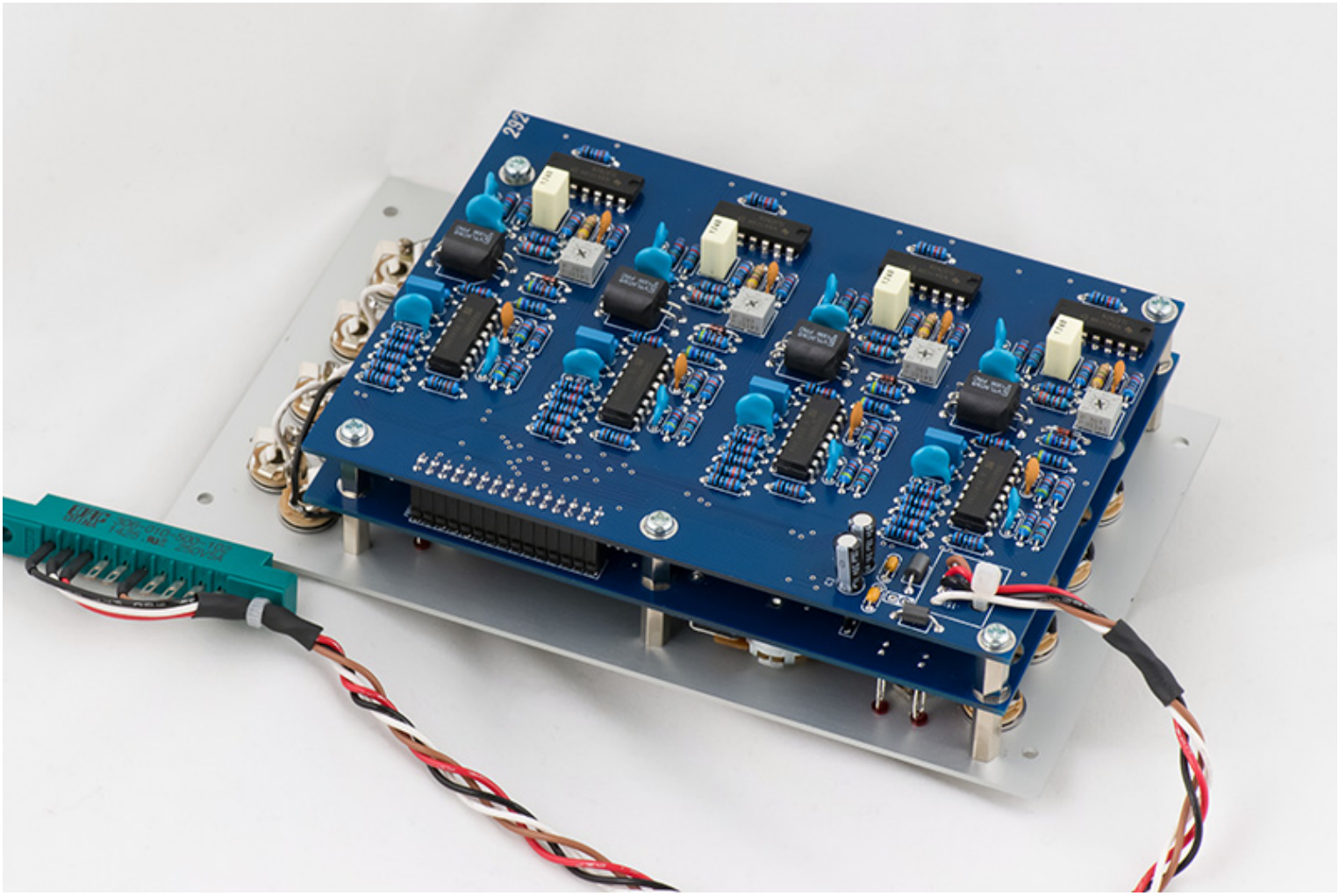
I chose to route the wires to the pads from the bottom of the PCB and I daisy chained the ground to the 9 jacks.



I matched the vactrols so the channels would be near equal. I powered the vactrol LED from +15 volts through a 2K2 resistor and measured the output resistance. The resistance slightly changes as the vactrol warms with the LED current so I used the initial resistance and selected four that were close in value. The two pads near the ferrite beads connect the Noisy ground to the Quiet ground if needed.

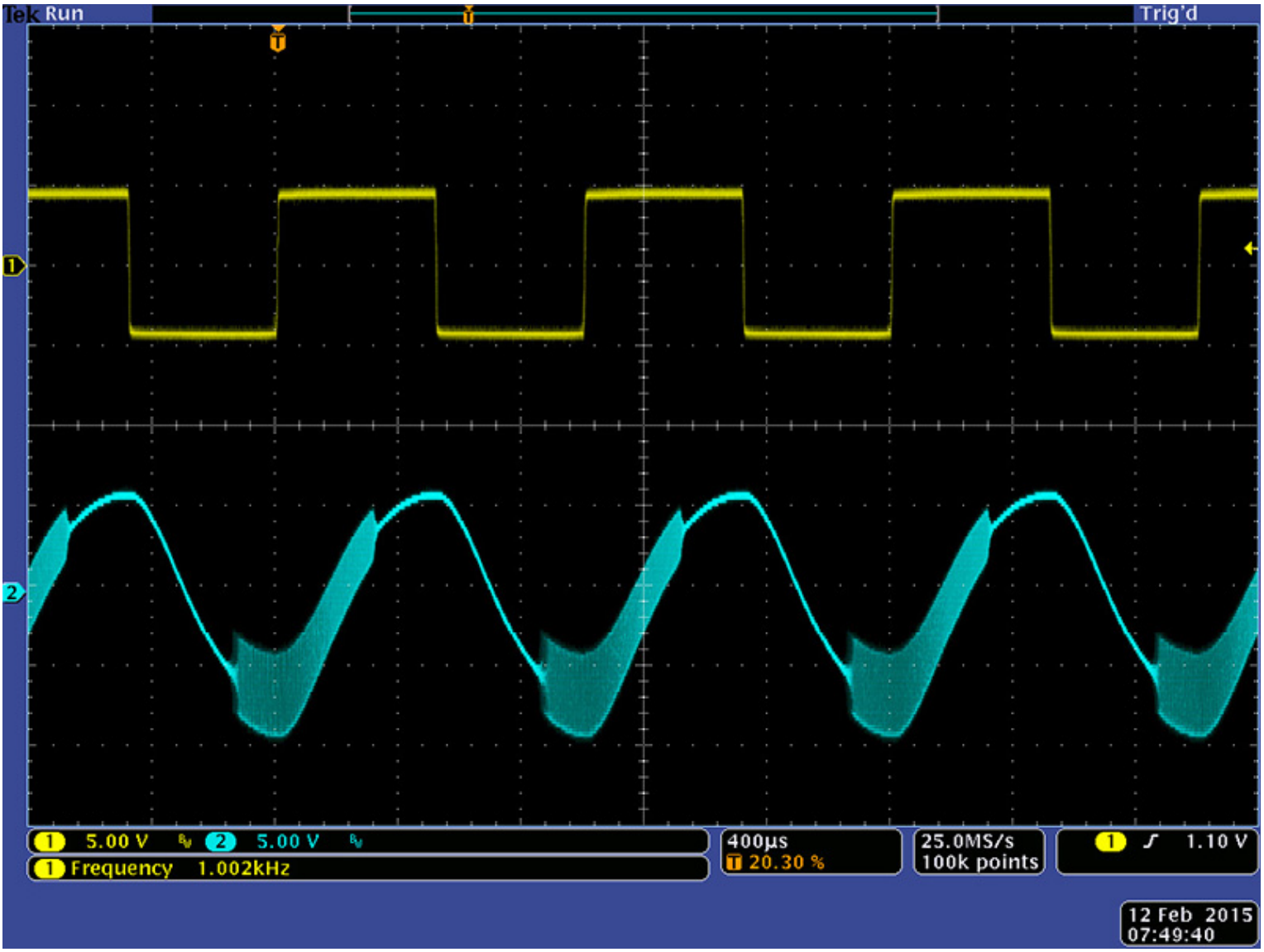


This photo shows the completed two PCB module.

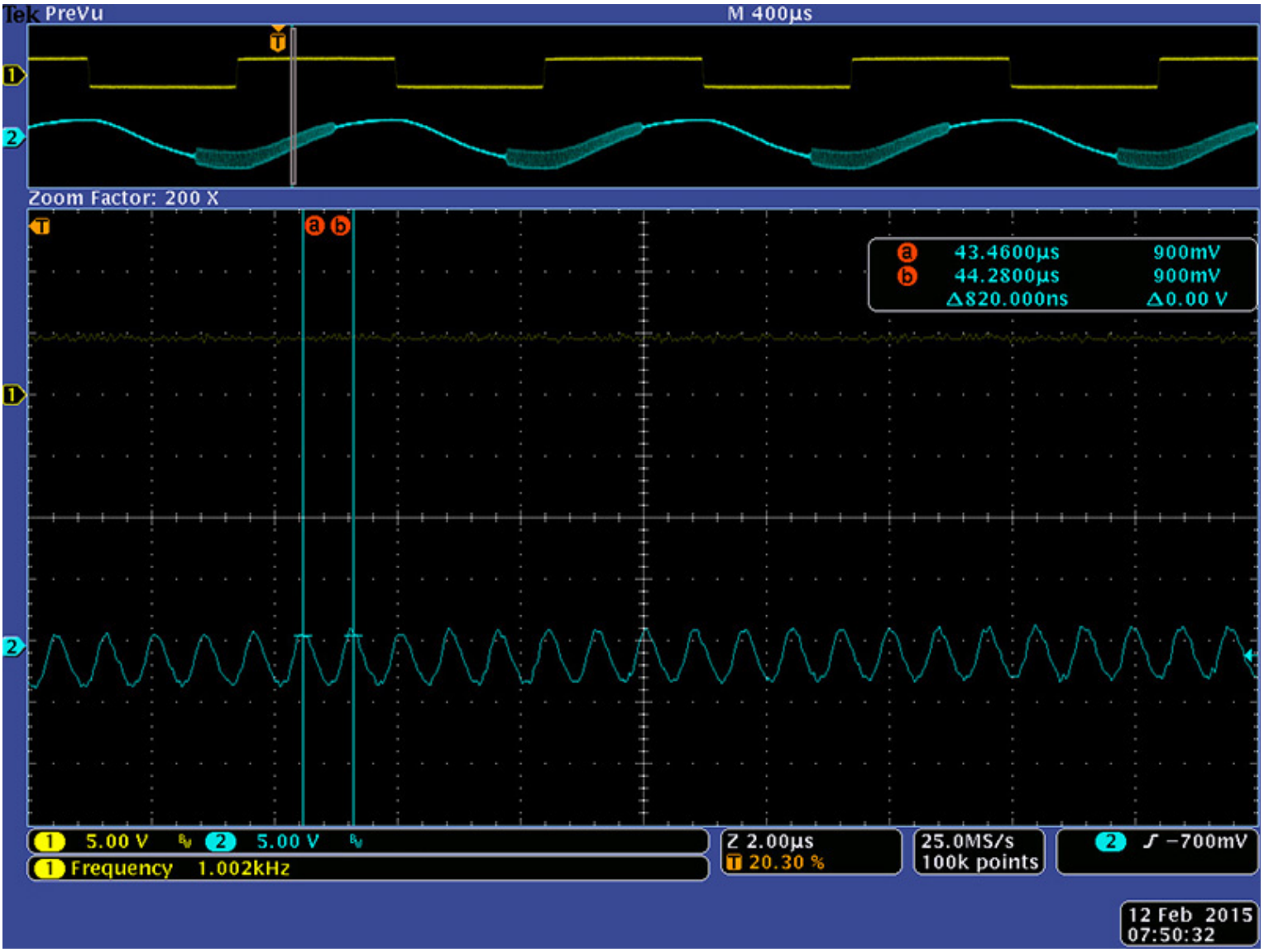


Operation

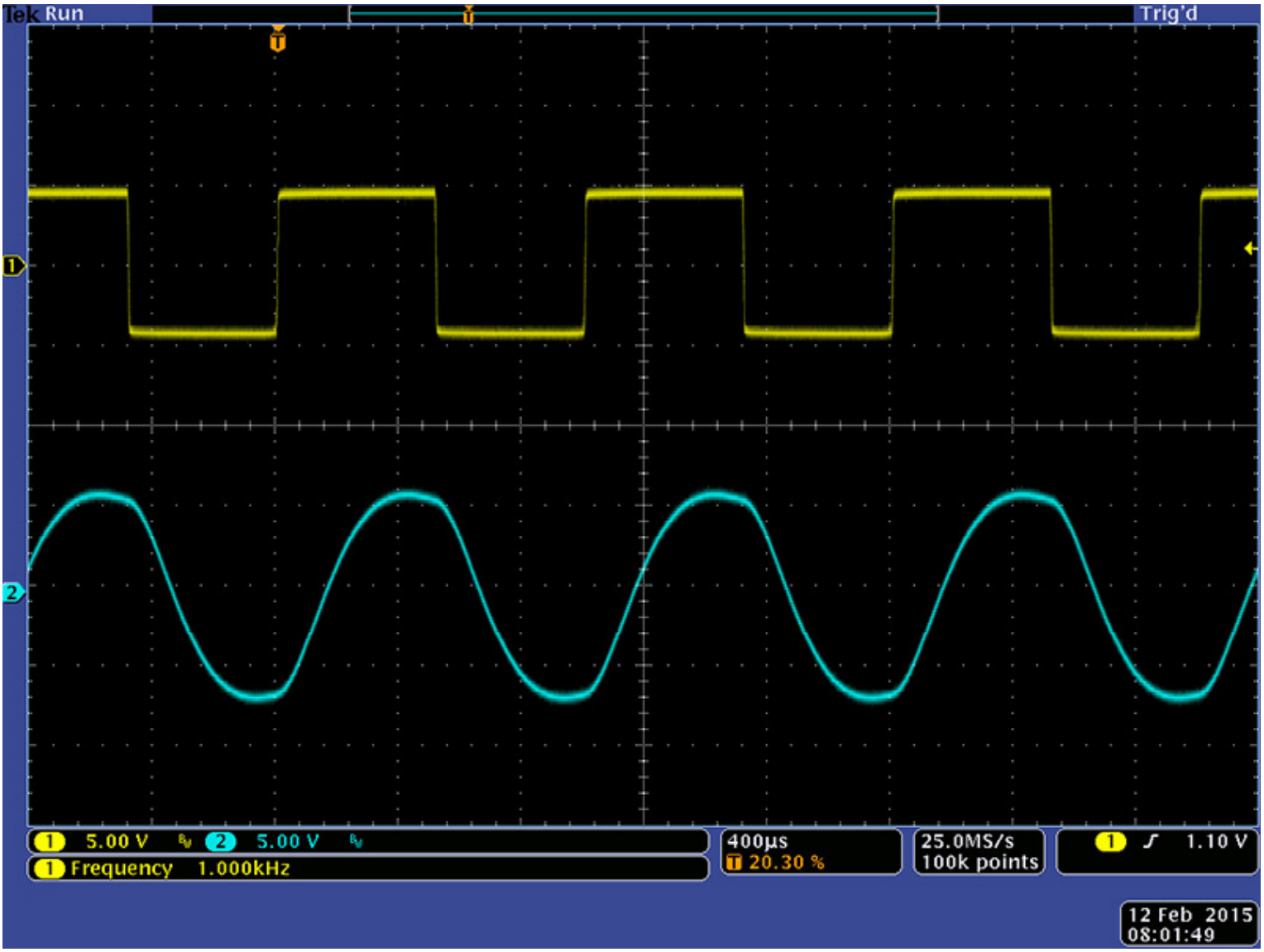
I had high frequency oscillations on all four sections at various settings of the controls. The QLPG design is known to oscillate due to the switching circuitry topology on the output op-amp.

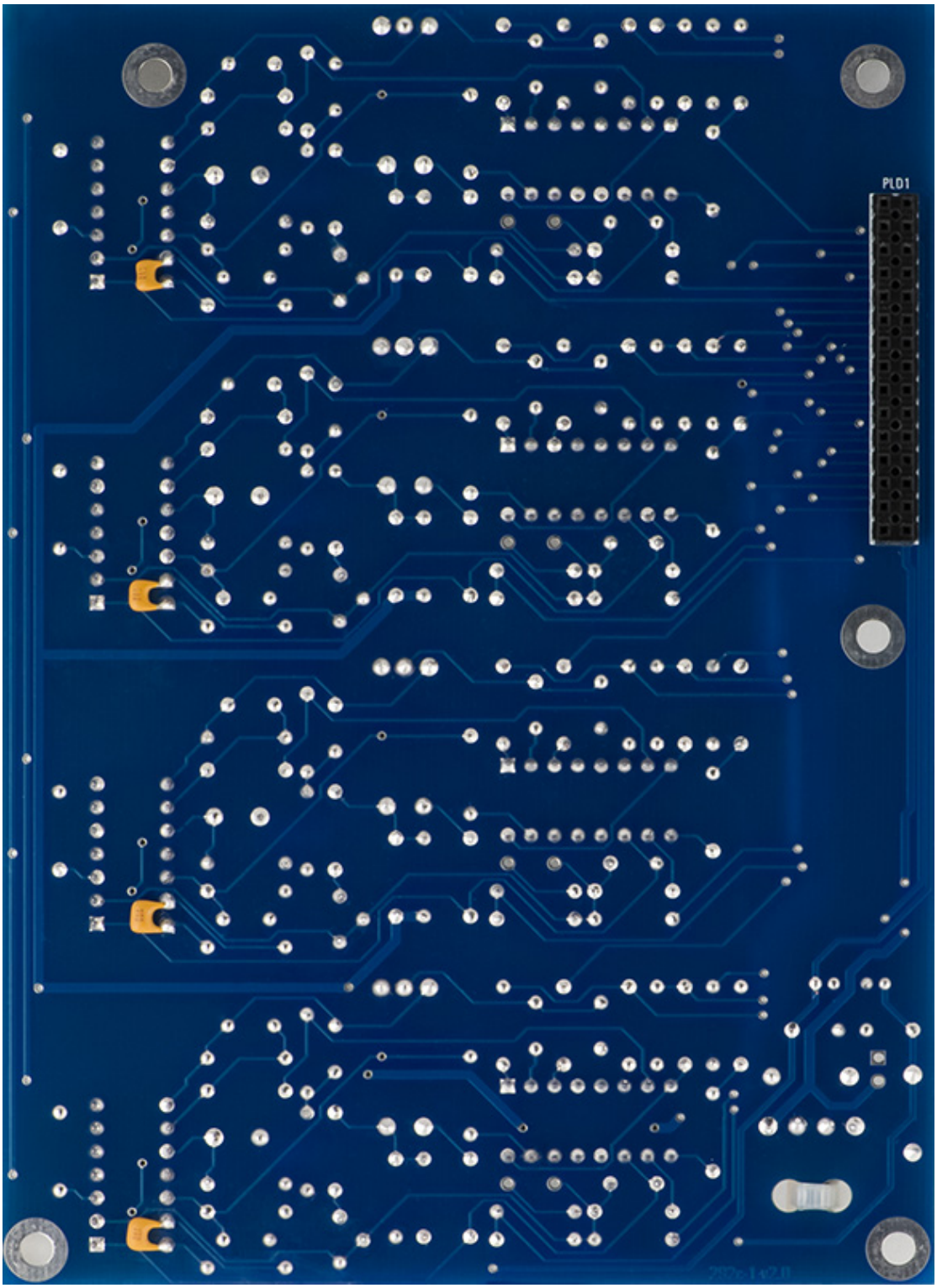


A quick cursor check shows an 820 nS period or a 1.22 MHz oscillation

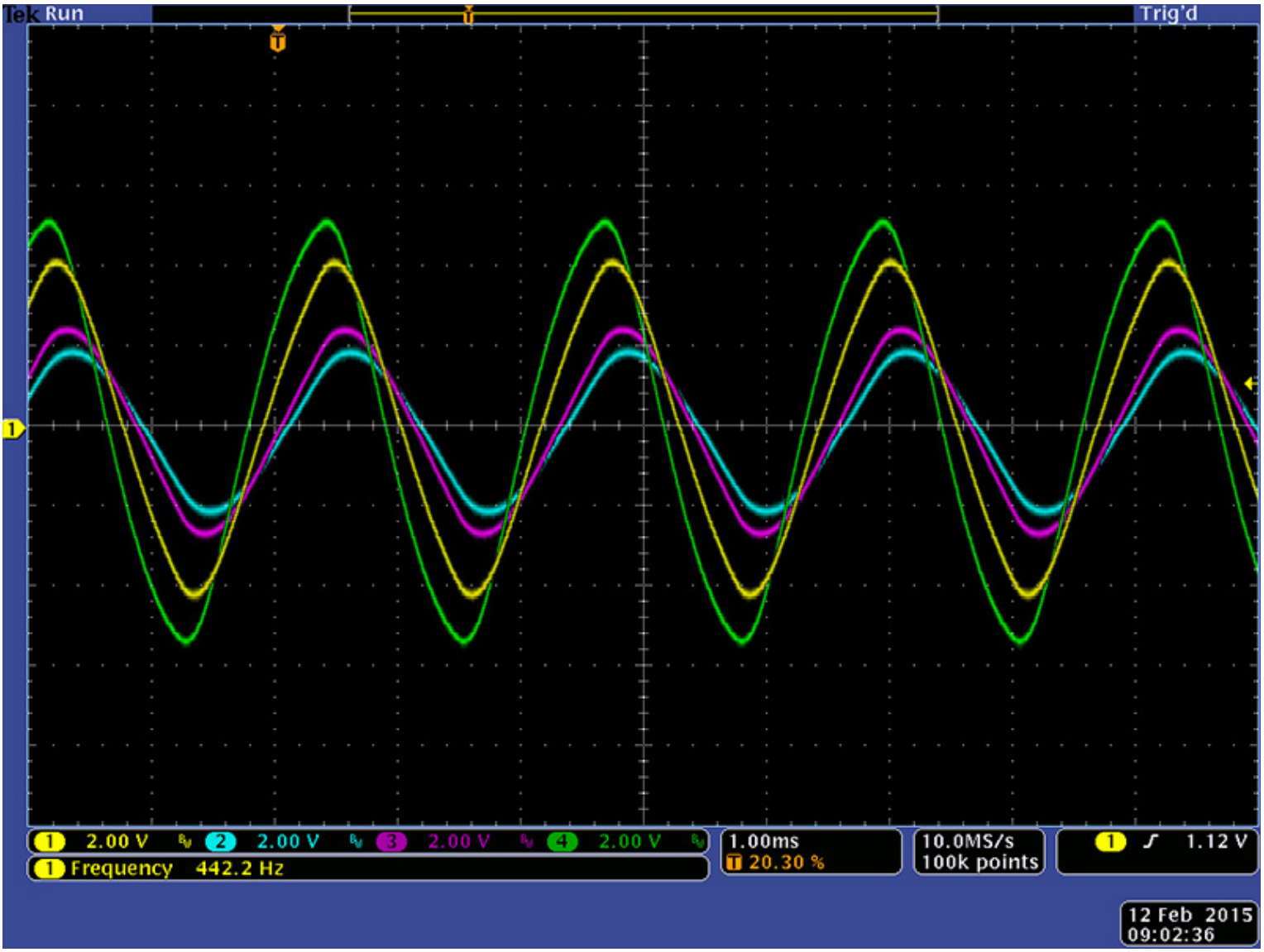


I added 22pF capacitors on the output op-amp to quiet things down.

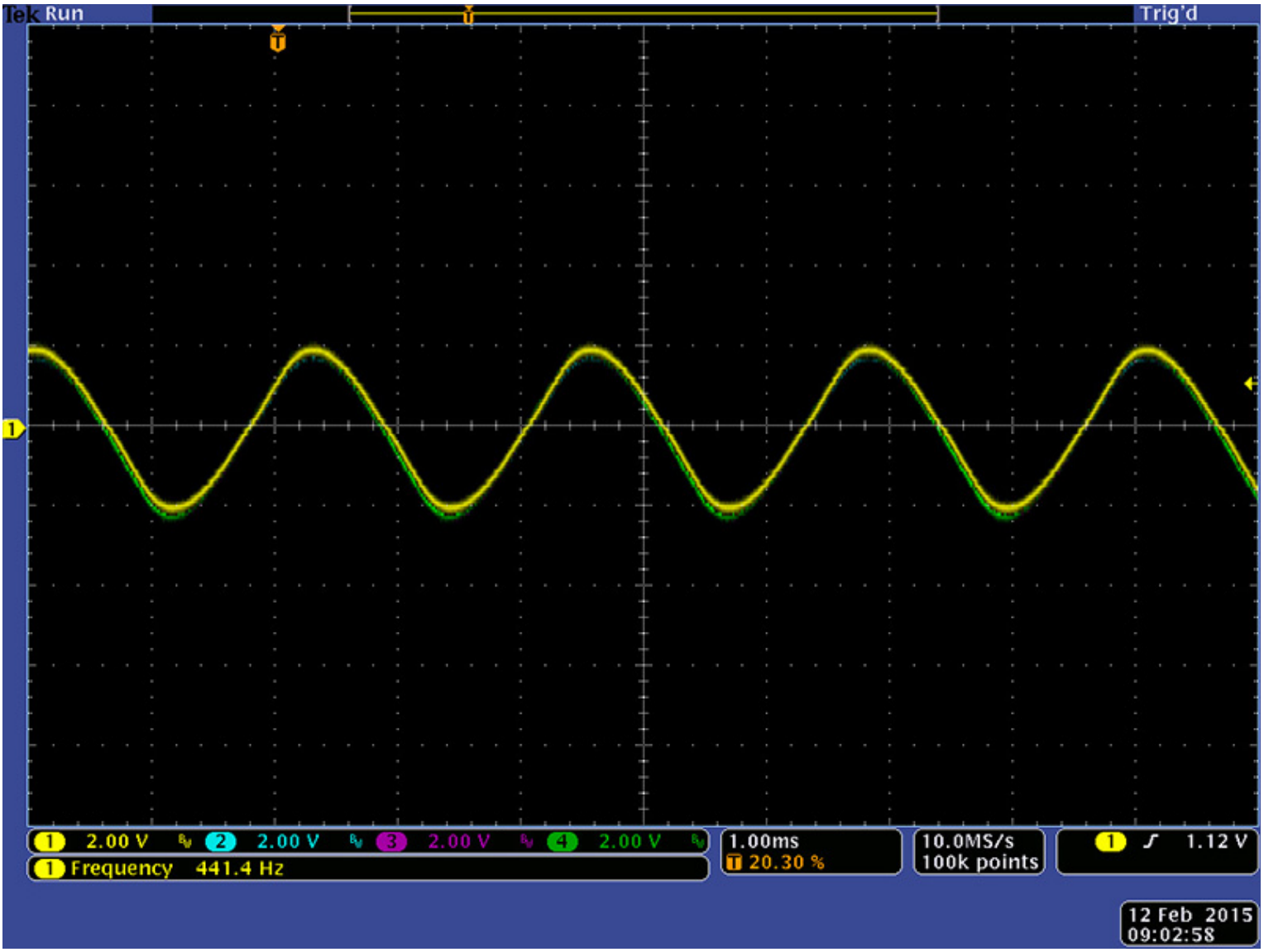

Tek Run
Trig'd
1
2
1 5.00 V 2 5.00 V
1 Frequency 1.000kHz
400µs
20.30 %
25.0MS/s
100k points
1 1.10 V
12 Feb 2015
08:01:49



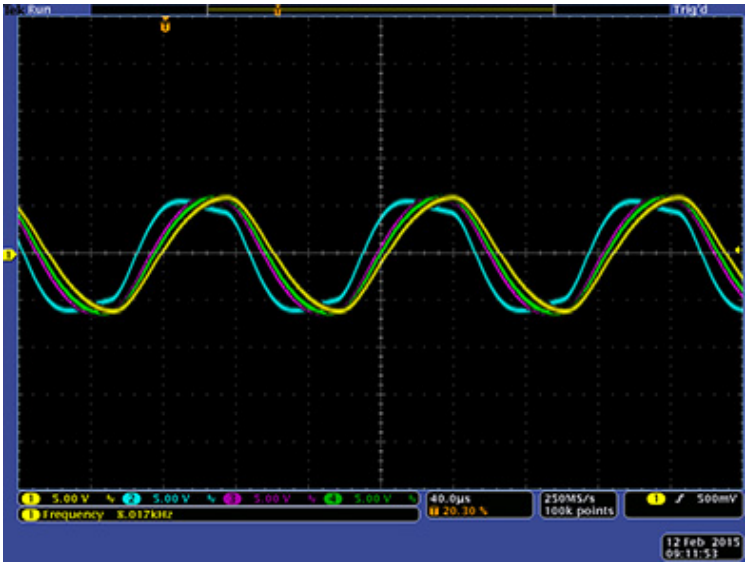
The trimmers set an offset for the controls to match the channels. I set the trimmers to minimum, the controls to mid-position, set the mode to lopass, and monitored all four outputs. The gain through each section differed.



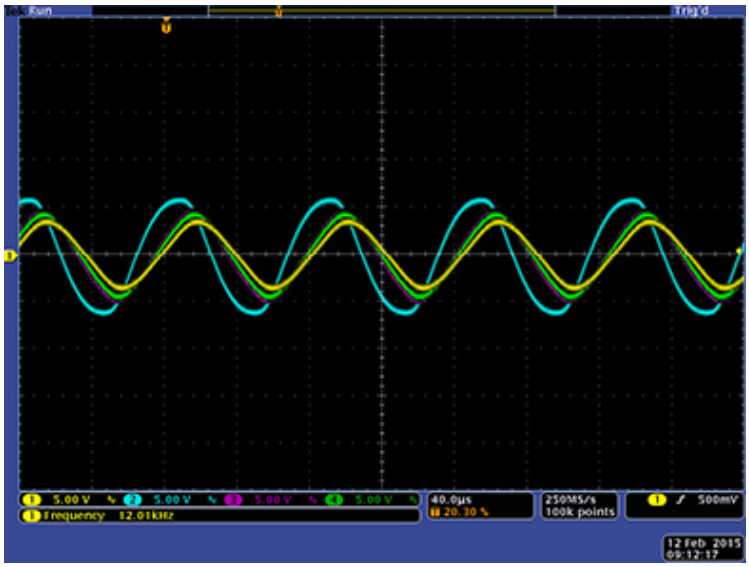
I determined which section had the lowest gain and adjusted the other trimmers to match the gain. Note in this image all four channels are shown superimposed so the matching between channels is quite good.

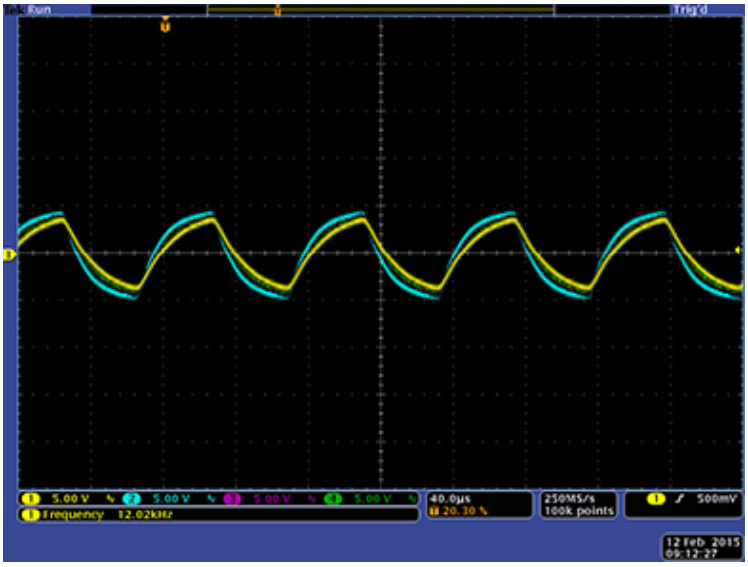


A check of the different control settings and input frequency showed good section to section matching from 20 Hz (left) up to 8 KHz (right).



By 12 KHz channel section B began to not track as well in lopass mode (left) but is reasonably matched in both mode (right).


Run
Trig'd
5.00 V
5.00 V
5.00 V
5.00 V
Frequency 12.01kHz
40.0µs
20.30 %
250MS/s
100k points
500mV
12 Feb 2015
09:12:17


Run
Trig'd
5.00 V
5.00 V
5.00 V
5.00 V
Frequency 12.02kHz
40.0µs
20.30 %
250MS/s
100k points
500mV
12 Feb 2015
09:12:27

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