Shiawassee Technical Services

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Steve Ahola

Dear Steve:

Here are my notes for the Classic 30 cathode bias mod. I essentially did what you described. While inside the amp I decided to add the selector switch since it added only the cost of the switch and the labor to run a couple extra wires. Since the amp was going to be hotter with the mod, I decided to make the fixed bias adjustable so I could heat that up to a similar level. I was shooting for not quite 30ma per tube. I was just aching to do something with that long trace from the cathodes around the end of the pc board, so I mounted my 1 ohm resistor there for current monitoring.

Specifics are noted on the parts layout as you did with your drawing. I removed the flyback diodes, but would have preferred to keep them. I did not want a forest of ground wires hanging all over the board to accomplish this though, so they went. Wire dress was not critical since all the wires either were grounds or were at steady DC. The cathode lead is not going to radiate anything or pick anything up either. Your J11/14 point is the proper place for all these grounds to go as well.

When I make a bias adjustable, I never use just a pot, I always use a pot and resistor in series to replace the fixed resistor – in this case R64, 33K – so as to protect the circuit. If my adjust pot were ever turned to zero with no series resistor, then the bias would also go to zero. SO I put in a resistor to set a minimum level of bias. I forget what I used now, but I believe I used a 22K resistor and a 10K pot there. On my drawing I noted the location of the adjust pot, but I did not draw in the extra terminal strip I mounted on the same rivet as the one at the plus end of the cathode cap. Drawing was already cluttered. Just imagine another terminal a half inch above the one shown. The series resistor I ran from the pot leg over to the extra terminal strip lug to provide a tie point for the wire back to the board.

The toggle switch is a small one. I located it just in front of the tranny. All he has to do is reach back till his fingers hit the tranny and he then can feel the switch. It is convenient for him, but it did want to get in the way of the ribbon cable during assembly. Next time I will move it over towards the center and farther back. There is no shortage of room back there.

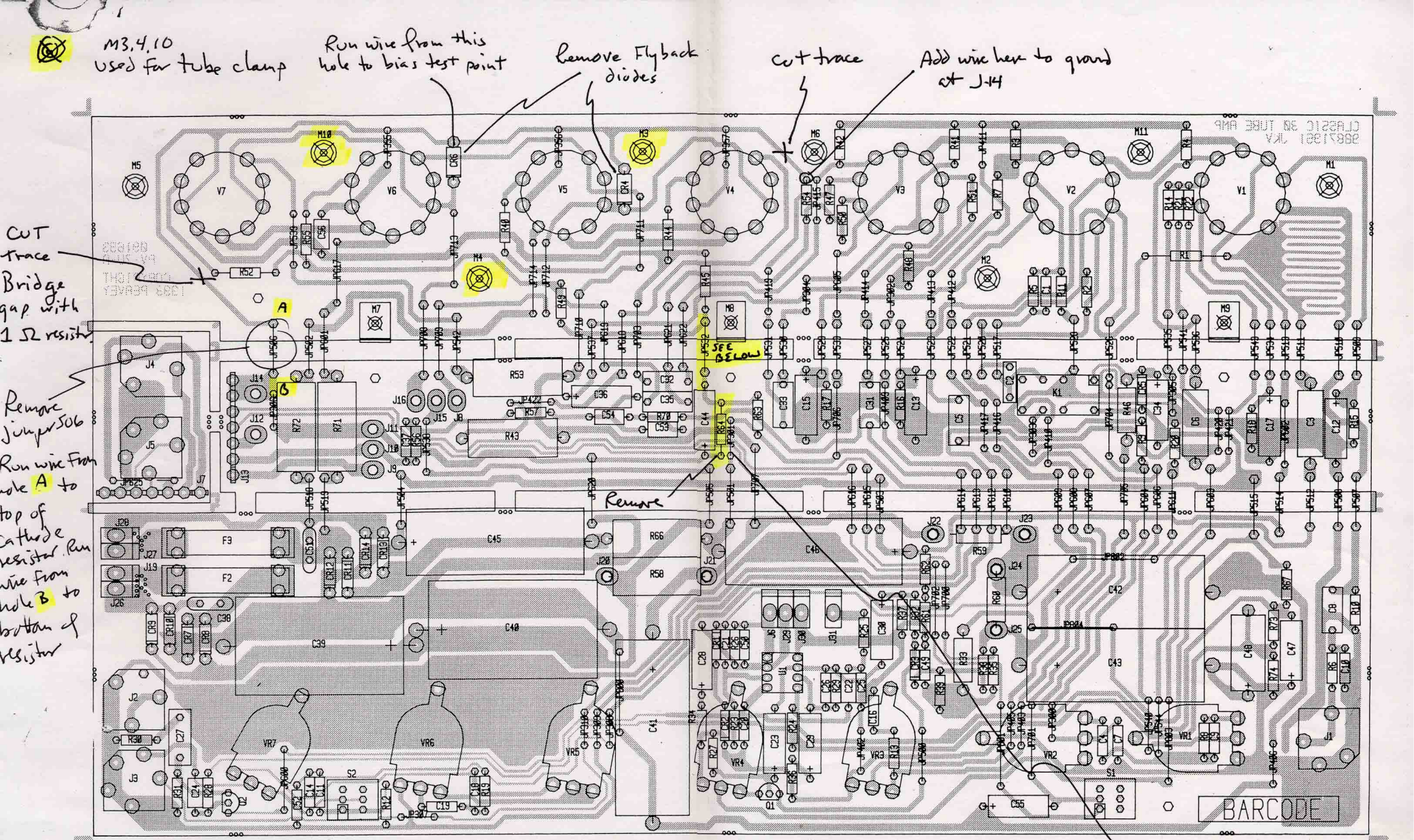
The switch circuit is simple. One side of the toggle connects the grids to either the fixed supply or ground. The other side of the toggle shorts out the Cathode resistor in fixed mode. I included two ways to wire it, either of which will work fine.

My customer is happy as a clam. He really likes it, and is telling people about it still. He also reports my clamp system is working perfectly. His tubes are holding up way longer than ever before. When I make the next few, I will send you one. Right now, I haven't cut the metal and I am short a couple pieces of hardware, but you will get one eventually. I removed the three screws in the holes marked. These are centered around the middle two output tubes. Then I mounted three 3" posts with 4-40 studs into the holes. My clamp is a plate made of 1/8 x 2" aluminum strap, six inch in length. Three holes to align with the posts and the plate is anchored by three screws. The 3" space just clears the tips of the tubes. I then added a double layer of dense foam for the tube tops to push into. The foam is ¼ thick by ¾ wide. I did not want the whole half inch of foam to be compressed in the sliver of space between the tip of the tube and the plate, so I punched 3/8 holes over the tubes in the outer layer of foam. The tips are into the foam, but the majority of pressure is on the shoulders of the tubes. They are in there secure, let me tell you. Customer has a big Weber speaker in there with the big magnet cover. We just cleared that. Stock speaker would be a breeze.

I hope these thoughts are of interest. You may use any of this material as you see fit, and you have my permission to include any of it on your web site if you wish. Sorry for the crude drawings. My email address is above if you need me.

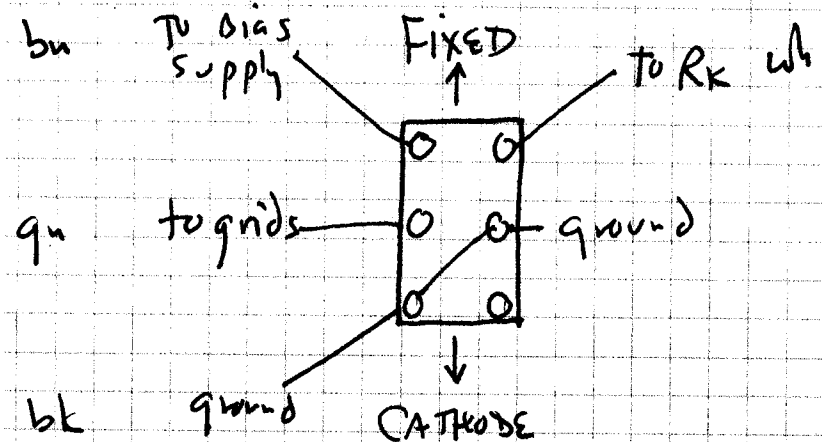
Best wishes.

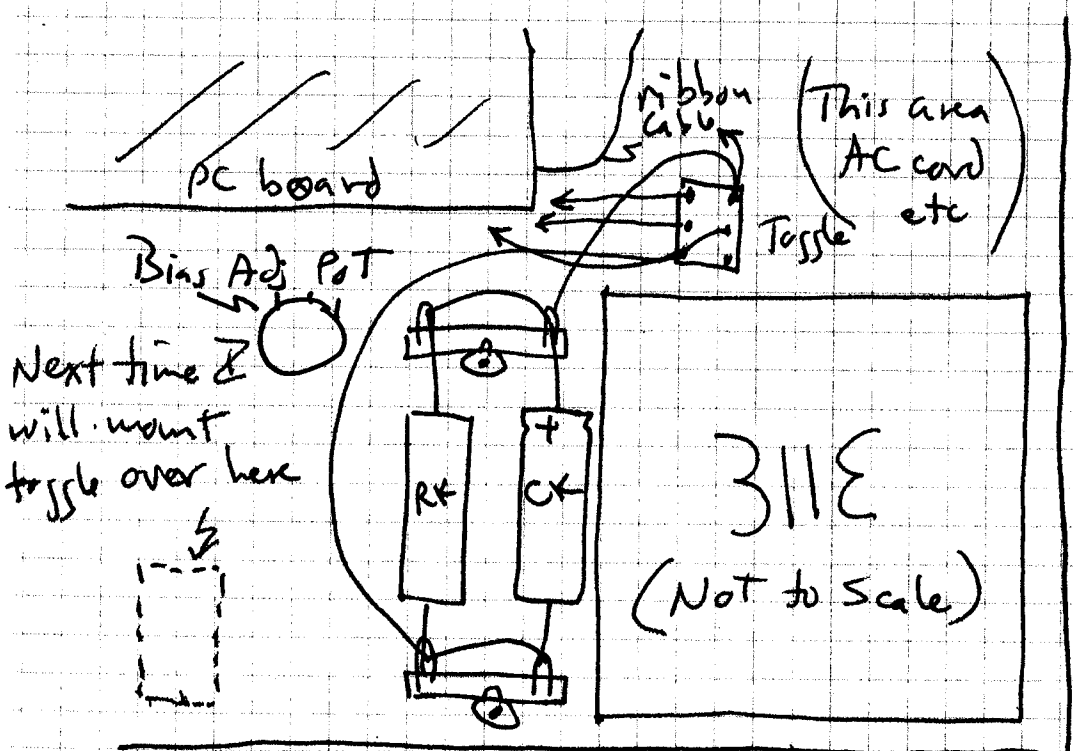
Douglas "Enzo" McCallum
Owner

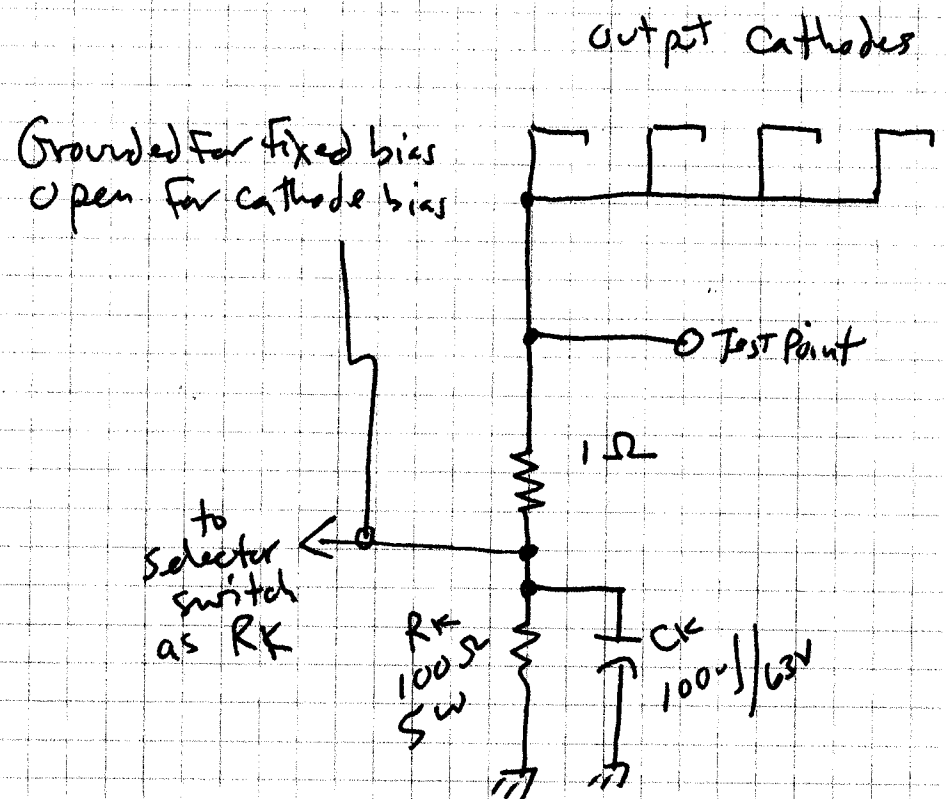

M3,4,10 used for tube clamp
Run wire from this hole to bias test point
Remove Flyback diodes
Cut trace
Add wire here to ground at J-14
CUT trace Bridge gap with 1 Ω resistor
Remove jumper J06
Run wire from hole A to top of cathode resistor. Run wire from hole B to bottom of resistor
SEE BELOW
Remove
JP532
Remove jumper - run wires from each hole to bias selector switch. R45 connection will be called "grids" & C44 connection will be called bias supply
Remove R64 - run wires from holes to bias pot.
BARCODE

Bias Selector Switch

DPDT Toggle





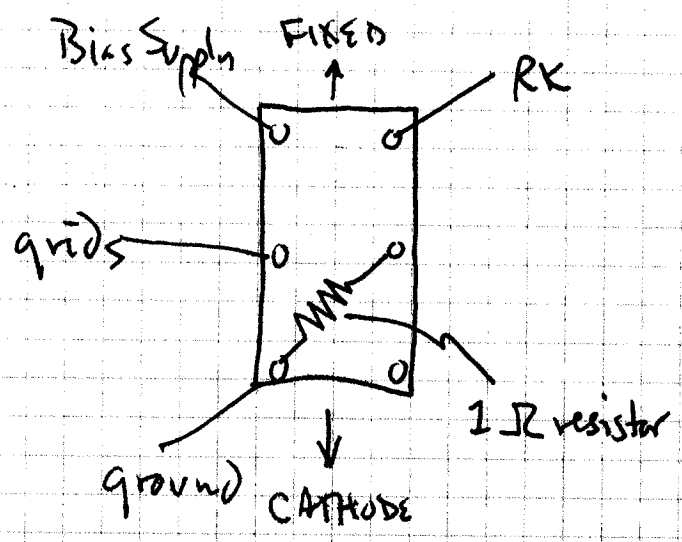


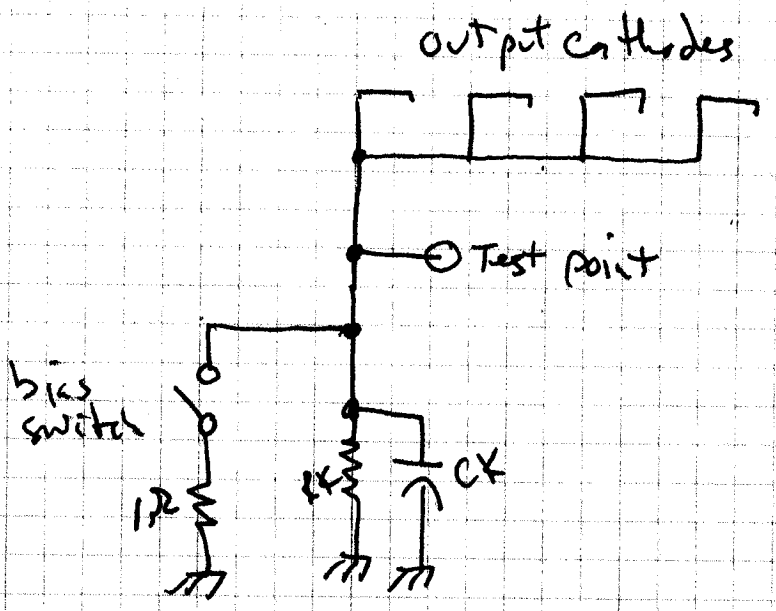
Test point measures millivolts per milliamp in fixed mode.

Test point measures cathode voltage in cathode mode. Calculate current based on resistor used.

The 1 ohm resistor does not materially affect the cathode voltage in cathode mode.

DPDT Bias selector switch





Alternative arrangement.
in this case the RK has no appreciable affect on the 1 ohm reading of voltage.

The diffrance is mainly when do you want to mount your 1 ohm part.