Specimen tube amplifier designs are informed by decades of servicing and building musical instrument amps. As a result of being subjected to the failure modes of these devices, I have formed strong opinions about what I require in a Specimen design and what I will not tolerate. I require robust construction, some would say overbuilt. I require a sensible flow of the circuit from input to output. I will not tolerate etched circuit boards of any type. Every part can be swapped, uninstalled, reinstalled, over and over, inviting experimentation, yet this design has undergone such extensive pushing and prodding of layout and circuit values that I see little need for variance. The Specimen hi-fi amp format is versatile, sensible, and beautiful. These units do their job with a smile, sound amazing, and will keep working indefinitely. What more could you ask for?

-Ian Schneller
This amp circuit is derived from the classic single-ended designs that began in the 1930s. Plug your CD player, turntable, iPod, computer, or home theater system into this elegant circuit and enjoy eight watts per channel of beautiful listening pleasure. The circuit can be used with a variety of different power tubes without modification (e.g., EL34, 6L6, 5881, 6550, KT66, KT77, KT88, KT120, KT150, 350B, etc). This amp is a perfect companion for Specimen Products Horn Speakers, but can also be used with most other speakers.

FEATURES

Tubes: Two 6SL7 tubes, two EL34 tubes, triode connected, one GZ34 rectifier tube
Controls: Two volume controls
Inputs: Two RCA input jacks
Power: 8 watts per channel
Weight: 20 lbs.
Dimensions: 16" deep x 11" wide x 8" high

Tools needed to build kit:

Soldering iron
solder
Tip cleaner
needle nose pliers
wire nippers
wire strippers
abrasive plastic pad (scotch bright)
Flat blade screwdrivers
Small crescent wrench or wrench set
Adequate illumination and possibly magnification
Clean padded work surface or caddy
Hardware - brown
Resistors - red
Transformers - green
Capacitors - blue

Output Transformer
1. Install four rubber feet (H10) with #8 x 1” feet screws (H11)
2. Install front (H13) and back (H14) panels with #4 x 1/2" flat head screws (H39)
3. Place steel Truss Rod (H16) in recess on top of wooden frame with index letter stamped on frame matching index number on rod.
4. Place Top Panel (H12) into recess on frame so that tube socket holes are towards front (small mouse hole)
5. Install twelve 8-32 x 3/4” panel screws (H30) to attach top panel.
6. Install two #8 x 3/4” flat head machine bolts (H31) and two nylon nuts (H32) through top panel and steel bar. Secure tightly.
7. Install the five octal tube sockets (H20) onto top panel using ten 6-32 x 3/8” binding head machine bolts (H27) and ten 6-32 lock nuts (H28). **Make sure that the sockets are oriented with the keyway pointing towards the rear of the amp.** Secure tightly.
8. Install the two 880Ω 25W power resistors (R6) inside the top panel with four 4-40 3/8" binding head machine bolts (H26) and four 4-40 small pattern nuts (H24) and four 4-40 Belleville washers (H25). Secure tightly.
9. Install the two female RCA input jacks (H1) onto the front panel with the two ground lugs bent to face one and other. Ground lugs should be on inside, washers should be outside. Secure tightly.
10. Install the two 100K potentiometer volume controls (R9) onto the top panel facing inward. Place toothed lock washer for each inside the top panel and the flat washer and nuts outside the top panel. Secure tightly.
11. Install the two speaker output binding posts (H3) onto the back panel with the red post on the right when the amp is in upright operating position. Secure tightly.
12. Install the fuse holder (H6) onto the back panel just to the right of the left speaker terminals when looking into the underside of the amp. Secure tightly.
13. Install the power switch (H8) onto the back panel just to the left of the right speaker terminals when looking into the underside of the amp. Secure tightly.
14. Install the IEC AC socket (H4) onto the back panel using two 4-40 x 3/8" binding head machine bolts (H26) and two 4-40 lock nuts (H22) Orient the socket so that the center lug is down when looking into the amp. Secure tightly.
15. install nineteen turrets (H9) into small holes on top panel with nineteen 4-40 x 1/4” binding head machine bolts (H23) and belleville washers (H25) Secure tightly.
16. Install power transformer 272HX (TR1) onto top panel with the two yellow, two green and one green/yellow wires coming up through the rear hole in the top panel. All other wires come up through the front hole. Use two 10-32 x 3/8” binding head machine bolts (H36) in the centermost holes and two 10-32 x 1 1/4” binding head bolts (H35) in the outermost holes. Use four 10-32 locking nuts (H37) Secure tightly.
17. Slip two aluminum spacers (H40) over the tightened nuts on the 1 1/4” bolts, then lay on the impedance terminal strip (H20.5) onto bolts with the extra end turret facing toward front of amp. Secure loosely with two 10-32 lock nuts (H37)
18. Install the choke 193G (TR2) onto top panel with two 10-32 x 3/8” binding head machine bolts (H36) in the centermost holes. Use four ground tabs (H19) splayed out separately in an X pattern under rear-inner choke mounting nut. Bend up slightly before securing VERY tightly. This becomes the “Ground star”. Use two 10-32 x 1 1/4” binding head machine bolts (H35) in the outermost holes. Use four 10-32 locking nuts (H37) Secure tightly.
19. Slip two aluminum spacers (H40) over the tightened nuts on the 1 1/4” bolts, then place the impedance terminal strip (H21) onto bolts. Secure loosely with two 10-32 lock nuts (H37).
20. Before installing the two output transformers (T3 and T4) Trim the secondary wires to these lengths and strip 3/4” of bare wire from the ends as follows:

T3 (install on the fuse side) Black 8” (Ground-Negative-Common), Orange 6.5”, Green 6”, Yellow 6”, White 4.5”, Blue 4”, Brown 5”

T4 (install on the switch side) Black 9.5”, Orange 8”, Green 6.5”, Yellow 6”, White 4”, Blue 4.5”, Brown 5”
21. Install the two output transformers (T3 and T4) with each set of trimmed and stripped secondary wires running along the wooden frame side. Use four 10-32 x 3/8" binding head machine bolts (H36) and four 10-32 locking nuts (H37) Secure tightly.
Lead Dress and Soldering

22. Remove impedance terminal strip (H21) and insert the stripped ends of the output transformer secondary wires starting with the forward facing turret in the order; white-16 Ohm impedance, yellow-8 Ohm impedance, green-4 Ohm impedance, orange- 2 Ohm impedance. Push the wire all the way through and bend it over where it sticks out the other side so that it is held captive. Make sure that the insulation is pushed all the way up into the underside of the turret. reinstall the impedance terminal strip and secure tightly.
23. Solder all the turrets of both impedance terminal strips making sure that solder has flowed down into the turret without coming out of the bottom.
24. Take the heavy gauge bus wire (H17), straighten it, then very gently clean it with a scotch bright pad to remove any oxidation. Carefully loop the ends with a pair of needle nose pliers and crimp onto turrets 1 and 14.
25. Using 18 gauge green filament wire 8” long, push back the insulation about 3/8” and crimp the ends around the rear ground bus turret 14. Using the same technique, connect the other end to lug 26 of the Ground star.
26. Using the same filament wire with the insulation removed, connect the rear terminals of the 880Ω 25W Cathode resistors (R6) to the ground bus (heavy gauge bus wire (H17)).
27. Solder All the dry connections made in steps 24 through 26.
28. Solder green/yellow wire coming up through rear hole (20) in the top panel and the red/yellow wire coming up through the hole below it (21) to the lug 24 of the ground star.
29. Twist the two green wires coming up through the rear hole in the top of the panel (20) and solder them to the lower part of turrets 15 and 16 (it doesn't matter which wire goes where)
30. Twist two yellow wires coming up through the rear hole (20) in the top of the panel and solder one of them to pin 8 on the center most tube socket (it doesn’t matter which wire goes where). Dry fit the other one to pin 2 on the same tube socket (this will be soldered after step 43)
31. Twist two red wires coming up through hole (21) and dry fit them to lugs 7 and 5 (it doesn’t matter which wire goes where) on the center most tube socket (these will be soldered in steps 45 and 46)
32. Solder a green wire from the lower ground terminal of the power socket to lug 25 of the Ground Star
33. Solder black wire coming out of output transformer (T3) (the one on the fuse side) to the black speaker terminal on the same side
34. Solder black wire coming out of the output transformer (T4) (the one on the power switch side) to the black speaker terminal on the same side
35. Solder a white plastic wire from the turret with the yellow wire running into its underside (8 Ohm connection) to the red speaker terminal on the right (use the leftover transformer wire)
36. Solder a white plastic wire from turret with the yellow wire running into its underside (8 Ohm connection) to the red speaker terminal on the left (use the leftover transformer wire)
37. Solder a jumper (bare wire) to lug 27 of the Ground Star. Dry fit the other end of the jumper to the lower part of turret 19 (this will be soldered in the next step)
38. Solder a jumper (bare wire) from the turret 19 to the turret 18, also soldering the wire from the previous step
39. Twist two black wires coming out of hole 23 and dry fit one of them to the lower part of turret 17 (it doesn’t matter which wire goes where) This wire will be soldered in the next step. The other wire should be dry fit to pin 2 on the center most tube socket (this will be soldered after step 43)
40. Solder two 6 1/2” long white cloth wires to the lower part of turret 17. One wire should be soldered to turret 12 along with the blue wire coming out of the output transformer (T4). The second wire should be soldered with the blue wire coming out of the output transformer (T3) to the lower part of turret 11.
41. Dry Fit brown wire coming out of the output transformer (T3) to pin 3 of the fuse side power tube socket on its side (this will be soldered after step 62)
42. Dry Fit brown wire coming out of the output transformer (T4) to pin 3 on the switch side power tube socket on its side (This will be soldered after step 61)
43. Solder the positive pole leg of a 20\(\mu\)F 500VDC capacitor (C5) to pin 2 of the center most tube socket. Solder the negative pole leg to turret 18.
44. Solder one leg of a 220Ω 1W resistor (red, red, yellow) (R7) to turret 18 and dry fit the other leg on turret 17 (this leg will be soldered in the next step)
45. Solder the negative pole leg of a 100µF 450VDC capacitor (C6) to turret 19. Solder the positive leg of the capacitor to turret 17 (the dry fit resistor from the previous step will also be soldered here)
46. Solder a ultra fast diode UF 4007 (RD10) between pins 6 and 7 on the center most tube socket, the gray stripe side soldered to pin 6. (The red wire from step 31 will be soldered here)
47. Solder an ultra fast diode UF 4007 (RD10) between pins 5 and 4 on the center most tube socket, the gray stripe soldered to pin 4 (The red wire from step 31 will be soldered here).
48. Solder a white wire from the ground lugs of the RCA jacks (H1) to turret 1
49. Solder a white wire from the RCA jack (H1) (on the fuse side) to the closest lug of the potentiometer (R9) on its side.
50. Solder a white wire from the RCA jack (H1) (on the power switch side) to the farthest lug of the potentiometer (R9) on its side.
51. Solder a white wire from the lug, closest to the amp frame, of the potentiometer (R9) on the switch side to the main ground bus
52. Solder a white wire from the lug, farthest from the amp frame, of the potentiometer (R9) on the fuse side to the main ground bus
53. Solder a white wire from the lower part of turret 2 to the main ground bus
54. Solder a white wire from the lower part of turret 9 to the main ground bus
55. Solder a white wire from the lower part of turret 10 to turret 3
56. Solder a white wire from the lower part of turret 13 to turret 8
57. Solder a white wire to the center lug of the switch side potentiometer (R9), dry fit the other end to pin 4 of the switch side preamp tube socket (this will be soldered in the next step)
58. Solder a white wire from pin 1 to pin 4 on the switch side preamp tube socket (the wire from the previous step will also be soldered)
59. Solder a white wire from the center lug of the fuse side potentiometer (R9) and dry fit the other end to pin 4 of the fuse side preamp tube socket (this will be soldered in the next step)
60. Solder a white wire from pin 1 to pin 4 to the fuse side preamp tube socket (the wire from the previous step will also be soldered)
61. Solder a 100Ω 1/2W resistor (brown, black, brown) (R8) between pins 3 and 4 of the switch side power tube socket (and the brown wire from step 42)
62. Solder a 100Ω 1/2W resistor (R8) (brown, black, brown) between pins 3 and 4 of the fuse side power tube socket (and the brown wire from step 41)
63. Solder one leg of a 27kΩ 1W resistor (Red, Violet, Orange) (R1) to turret 12 and dry fit the other leg to turret 13 (this will be soldered in the next step)
64. Solder the positive pole leg of a 40µF 500V capacitor (C4) and the resistor from the previous step to turret 13. The negative pole leg should be soldered to turret 9.
65. Solder one leg of a 27kΩ 1W resistor (Red, Violet, Orange) (R1) to turret 11. Dry fit the other leg to turret 10 (this will be soldered in the next step)
66. Solder the positive pole leg of a 40µF 500V capacitor (C4) and the resistor from the previous step to turret 1. The Negative pole leg should be soldered to Turret 2.
67. Solder one leg of a 1kΩ 1/2W resistor (brown, black, red) (R4) to pin 5 of the mid-left tube socket. Insulate this leg with a 1/16" gauge 3/8" long heat shrink tube (H44). Dry fit the other leg to the low part of turret 4 (this will be soldered in the next step)
68. Solder a 330kΩ 1/2W resistor (orange, orange, yellow) (R5) between the lower part of turret 4 and the main ground bus. Solder the resistor from the previous step.
69. Solder one leg of a 1KΩ 1/2W resistor (brown, black, red) (R4) to pin 5 of the middle right power tube socket. Insulate this leg with a 1/16" diameter 3/8" long heat shrink tube (H44). Dry fit the other leg to the low part of turret 7 (this will be soldered in the next step)
70. Solder a 330kΩ 1/2W resistor (orange, orange, yellow) (R5) between the lower part of turret 7 and the main ground bus. Solder the resistor from the previous step.
71. Solder one end of a white wire to pins 1 and 8 of the mid right tube socket. Dry fit the other end to the right 880Ω 25W power resistor (R6) lower lug (this will be soldered in the next step).
72. Solder the negative leg (marked with a stripe) of a radial lead 100µF 100V capacitor (C3) to the main ground bus. Solder the positive leg to the lower lug of the 880Ω 25W power resistor (R6) on the right. Solder the wire from the previous step.
73. Solder one end of a white wire to pins 1 and 8 of the mid-left power tube socket, dry fit the other end to the left 880Ω 25W power resistor (R6) lower lug (this will be soldered in the next step)
74. Solder the negative leg (marked with a stripe) of a radial lead 100µF 100V capacitor (C3) to the main ground bus. Solder the positive leg to the lower lug of the 880Ω 25W power resistor (R6) on the left. Solder the wire from the previous step.
75. Solder the negative leg (marked with a stripe) of a 100µF 25V radial lead capacitor (C2) to the main ground bus. Dry fit the positive leg to pin 6 of the lower right tube socket (this will be soldered in step 77.)
76. Solder one leg of a 1kΩ 1W resistor (brown, black, red) (R3) to the main ground bus. Dry fit the other leg to pin 6 on the lower right tube socket (this will be soldered on the next step)
77. Solder a white wire between pins 6 and 3 of the lower right tube socket. The resistor and capacitor from the last two steps will also be soldered.
78. Solder the negative leg (marked with a stripe) of a 100µF 25V radial lead capacitor (C2) to the main ground bus. Dry fit the positive leg to pin 3 of the lower left preamp tube socket (this will be soldered in step 80)
79. Solder one leg of a 1kΩ 1W resistor (brown, black, red) ($R_3$) to the main ground bus. Dry fit the other leg to pin 3 of the lower left tube socket (this will be soldered in the next step)
80. Solder a white wire between pins 6 and 3 of the lower left tube socket. The resistor and the capacitors from the last two steps should also be soldered.
81. Solder one end of a white wire to the lower part of turret 6. Dry fit the other end to pin 2 of the lower right preamp tube socket (this will be soldered in step 86)
82. Solder a 100kΩ 1W resistor (brown, black, yellow) (R2) between turrets 6 and 8
83. Solder one end of a white wire to pin 5 and dry fit the other end to pin 2 on the lower right tube socket (this will be soldered on the next step)
84. Insulate one leg of a .22\u2126F 600V capacitor (C1) with a 1/16" gauge 1" length of heat shrink tubing (H44) (this will be soldered to turret 7) and insulate the other leg with a 1/16" gauge 1/2" length of heat shrink tubing (H44) (this will be soldered to pin 2 of the lower right tube socket) solder this capacitor as described.
85. Make a little hook on one leg of a 100kΩ resistor, (brown black yellow) (R2) and dry fit it to pin 2 of the lower left preamp tube socket. Bend this leg across turret 5 and twist the other leg on turret 3. Solder the resistor to turrets 3 and 5 (the hook will be soldered on the next step)
86. Solder one end of a white wire to pin 2 of the lower left preamp tube socket (the hook from the previous step should also be soldered). Dry fit the other end of the white wire to pin 5 (this will be soldered on step 88)
87. Insulate both legs of a .22µF 600V capacitor (C1) with a 1/16” gauge 1” length of heat shrink tubing
88. Solder the .22µF 600V capacitor (C1) between turret 4 and pin 5 of the lower left preamp tube socket (the wire from step 86 should also be soldered)
89. Trim the bare part of the yellow black wire coming out of the power transformer then bend the wire to form a “U” shape. Use a 3/16” gauge 1” length of heat shrink tubing (H45) to hold and insulate the bent wire.
90. Trim the bare part of the gray wire coming out of the power transformer then bend the wire to form a “U” shape. Use a 3/16” gauge 1” long of heat shrink tubing (H45) to hold and insulate the bent wire.
91. Cut four pieces of 7 1/2” long green cloth wire and twist two together in 1/2” intervals to create 2 sets of braided wires.
Cut four pieces of 5 1/2” long green cloth wire and twist two together in 1/2” intervals to create 2 sets of braided wires.
92. Take one of the 7 1/2" long green twisted wire pairs and dry fit one of the wires to turret 15 (it doesn’t matter which one). Dry fit the remaining wire from the same end to turret 16. (Both will be soldered in the next step)
93. Take the other 7 1/2" long braided of wires and solder one of the wires to turret 15 (it doesn’t matter which one). Solder the remaining wire from the same end to turret 16. (the wires from the previous step should be soldered)
94. Take the loose end of one of the braided wires from the previous step, and dry fit one of the wires to pin 7 and the remaining wire from the same end to pin 2 of the mid power tube socket on the fuse side (it doesn’t matter which one goes where. These two wires will be soldered on the next step)
95. Take one of the 5 1/2” long braided wires and solder one of the wires to pin 7 and the remaining wire from the same end to pin 2 of the mid power tube socket on the fuse side. It doesn’t matter which one goes where. (The wires from the previous step should be soldered)
96. Take the loose end of the braided wires from the previous step and Solder the to wires to pins 8 and 7 of the preamp tube socket on the fuse side (it doesn’t matter which one goes where)
97. Dry fit the loose end of the 7 1/2” long braided wires to pins 7 and 2 of the mid power tube socket on the power switch side. It doesn’t matter which wires go where. (These wires will be soldered on the next step)
98. Solder one end of the 5 1/2" long braided of wires to pins 7 and 2 of the mid power tube socket on the switch side. It doesn’t matter which wires go where. (The wires from the previous step should also be soldered)
99. Solder the loose end of the 5 1/2" long braided wires to pins 7 and 8 of the lower right preamp tube socket on the power switch side (it doesn’t matter which one goes where)
100. Twist the white and the black wires coming out of the power transformer together and solder the white wire to the right lug of the AC power socket.
101. Solder the black wire coming out of the power transformer (twisted with the white one) to the left lug of the power switch
102. Use yellow wire from the leftover transformer trimmings, solder it to the center lug of the fuse holder. Twist the wire twice around the twisted black and white wires coming out of the power transformer and solder the other end to the left lug of the power socket.
103. Use yellow wire from the leftover transformer trimmings, solder it to the side lug of the fuse holder. Twist the wire around the twisted black and white wires coming out of the power transformer all the way to the power switch. Solder the loose end to the right lug of the power switch.
104. Install a 2 amp 250V slow blow fuse (H7) in the fuse holder
105. Install the volume knobs (H2)
106. Install two 6SL7 (V3) tubes in the sockets close to the volume knobs
107. Install two EL34 power tubes (V2) in the middle tube sockets
108. Install one GZ34 tube (V1) in the tube socket close to the power transformer
109. Place the amp frame so that the “mouse hole” is in front of you. Measure 1 1/4” from the right and mark it with a piece of tape. Measure 1 1/8” from the bottom and mark it with a piece of tape. Peel the protective cover away from the adhesive on the back of the logo plate (H18) and carefully install Specimen logo.
You have Finished your amp!