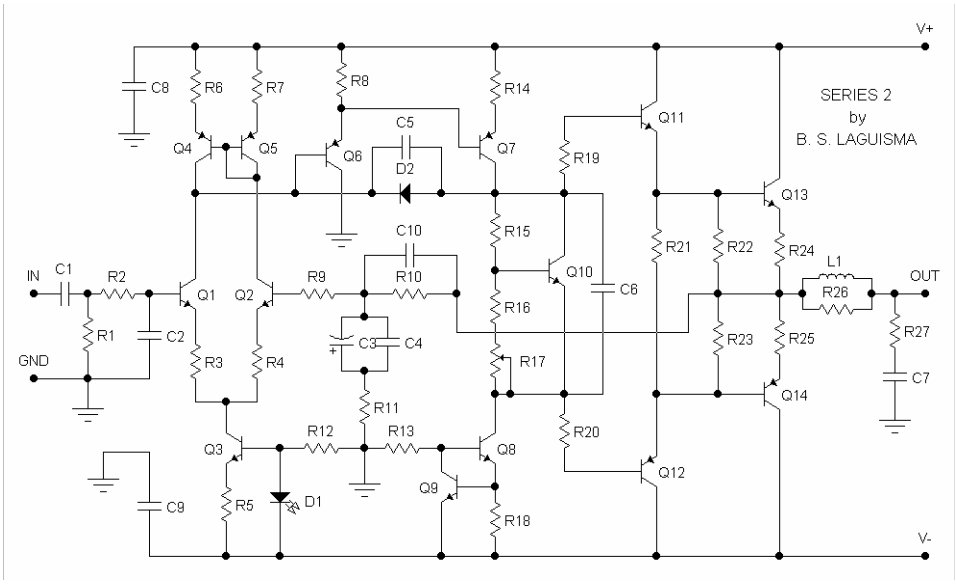
A HIGH PERFORMANCE

AUDIO POWER AMPLIFIER

SERIES 2



Circuitry designed by **LAGUISMA ELECTRONICS**, Baguio City.

The values are for any power rating from 50 watts to 100 watts rms.

R1	33 kΩ	R14	100 Ω	R27	10-22 Ω / 2 watts	Q1	BC337
R2	2.7 kΩ	R15	3.3 kΩ	C1	3.3 µF/50v N.P.	Q2	BC337
R3	120 Ω	R16	1.0 kΩ	C2	330-680 pF	Q3	H9013
R4	120 Ω	R17	1.0 kΩ *"trimpot"*	C3	220 µF/10-25v	Q4	ED1802 / CS9015
R5	470 Ω	R18	100 Ω	C4	0.1 µF /50v	Q5	ED1802 / CS9015
R6	82 Ω	R19	47 Ω	C5	150 pF	Q6	A562 / CS9015
R7	82 Ω	R20	47 Ω	C6	0.1 µF /50v	Q7	2N5401
R8	1.0 kΩ	R21	120 Ω	C7	0.1 µF /100v	Q8	2N5551
R9	330 Ω	R22	5.6 kΩ	C8	1.0 µF /50-100v	Q9	2N4401 / S8050
R10	33 kΩ	R23	5.6 kΩ	C9	1.0 µF /50-100v	Q10	2N4401 / S8050
R11	1.2 kΩ	R24	0.33 Ω / 5w	C10	10 pF	Q11	TIP41C
R12	15 kΩ	R25	0.33 Ω / 5w	D1	LED (any color)	Q12	TIP42C
R13	22 kΩ	R26	10-22 Ω / 1w	D2	1S2471 diode	Q13, Q14	(see below)

Note: Unless otherwise indicated, all resistors are ¼ watt, 5% tolerance. Coil L1 is made up of 17-20 turns #18AWG magnet wire wound on a 5/16-inch diameter coil form.

Power transistors Q13/Q14 vary, depending on the voltage of the power transformer used. For transformers with the following secondary voltages (4 Amperes or more):
56 volts ct (**50 watts output**): Use the complement, 2N3055/MJ2955, TIP3055/TIP2955, 2SC5198/2SA1941, or equivalent.
72 volts ct (**100 watts output**): Use the complement, MJ15015/MJ15016, 2SC2922/2SA1216, or equivalent. Highly Recommended: 2SC5200/2SA1943

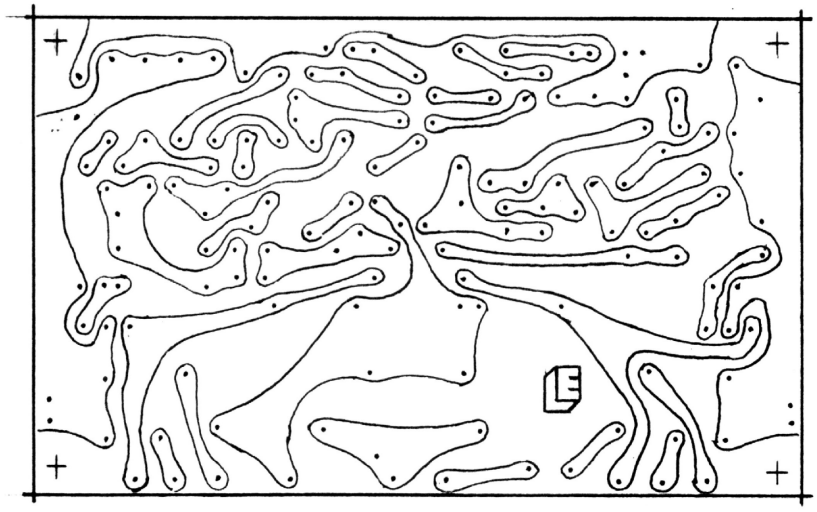
*For higher power, or an in-depth analysis of the circuit, consult **the** book*

A HIGH PERFORMANCE AUDIO POWER AMPLIFIER
DESIGN AND ANALYSIS

THE SERIES 2

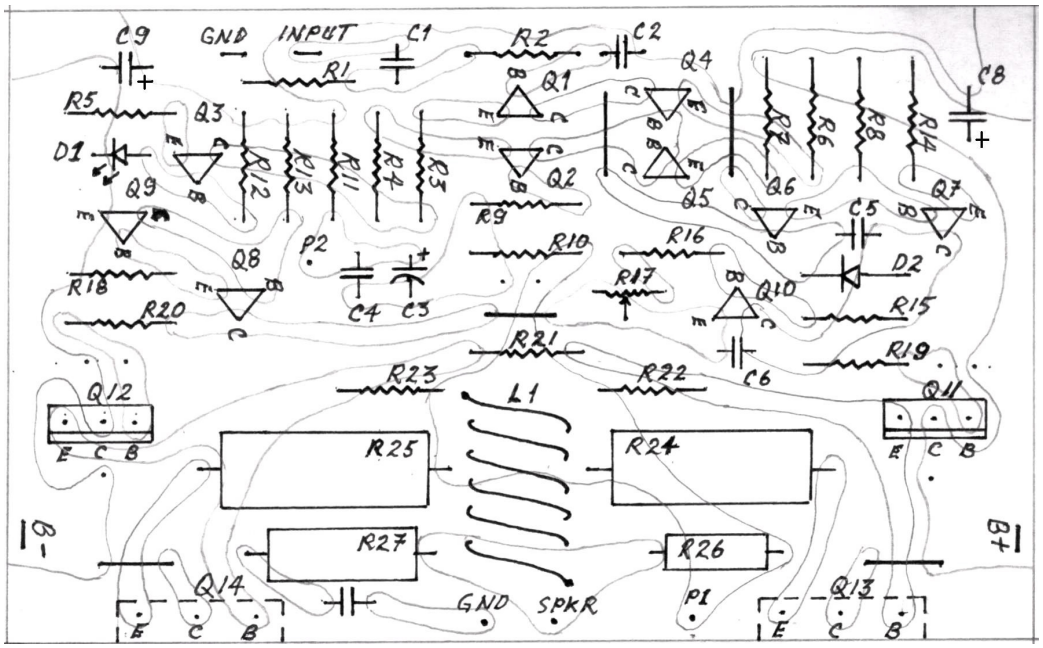
AUDIO POWER AMPLIFIER

Actual size foil pattern and component layout.



Cut out the foil pattern and tape its edge securely to an equal size PCB. With a center punch (a sharp nail will do), mark the holes for the components by punching through the foil pattern. This insures the accurate position of the components. Remove the foil pattern, and with a waterproof pentel pen, connect the appropriate mark for the holes, copying the foil pattern as guide.

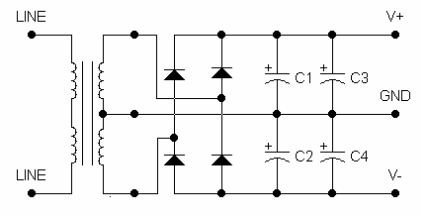
Note: The PCB is so designed that the terminal leads of type TO-3Px (TO-218 or TO-247) power transistors, such as the pair 2SA1943/2SC5200 or 2SA1216/2SC2922, may be soldered directly on the board.



PCB DESIGN BY LAGUISMA ELECTRONICS

SERIES 2 AUDIO POWER AMPLIFIER

ADJUSTMENT PROCEDURE:



1. Mount the parts following the layout guide. **Do not connect the power transistors yet.**
2. Connect the circuit board to the power supply made for it. See to it that the input ground connection is not left out. The output ground does not have to be connected in the adjustment procedure. **Never connect a jumper between input and output ground.**
3. Apply power, and check for abnormal warming of components. Only Q7, Q8, Q11, and Q12 should be slightly warm.
4. Measure the output offset voltage (DC voltage between ground and the output terminal). Readings should be less than +/-50 mV. If the reading is greater than 50 mV but less than 300 mV, check for errors at the differential circuit stage. (Try interchanging Q1 and Q2). If the readings are high (bordering in volts), mistakes in component or the PCB board are apparent.
5. If the offset voltage is less than 50 mV, proceed to adjust R17. Connect a voltmeter across R21. Decrease the resistance of R17 until a reading of about one volt is read across R21. It is safer not to exceed one volt.
6. Put off the power supply and connect the power transistors. It is imperative that the power transistors be mounted to an appropriate-size heatsink. Check also that the transistors are insulated from the heatsink especially if the heatsinks are directly mounted on the chassis. This finishes the adjustment.

Note:
For better thermal stability, transistor Q10 (may be replaced with TO-126 type transistor) should be mounted on the heatsink of the power transistors. The transistor body must touch the heatsink. The wires connecting the transistor to the PCB should be as short as possible and away from the input stages.

Optional:
For best performance, the amplifier may be readjusted for minimum distortion. Follow the procedures below:

1. Play music for about 5 to 10 minutes at moderately loud levels. This will heat up the power transistors to a normally warm temperature.
2. Cut off the sound and connect a voltmeter across R24 and R25 (Emitter terminal of Q13 to emitter terminal of Q14).
3. Adjust R17 until a reading of about 15 mV is attained. This sets an idle current of the power transistors of about 20 to 25 mA. The presence of an idle current in the power transistors will decrease the crossover distortion, which will make the sound of the amplifier cleaner especially the high frequencies. Do not increase the idle current too high, as the power transistors will easily become hot unless they are mounted in a large heatsink or equipped with cooling fans.
