

GT-102 Amplifier Module
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 U1 is LM3886 with
 non-isolated case

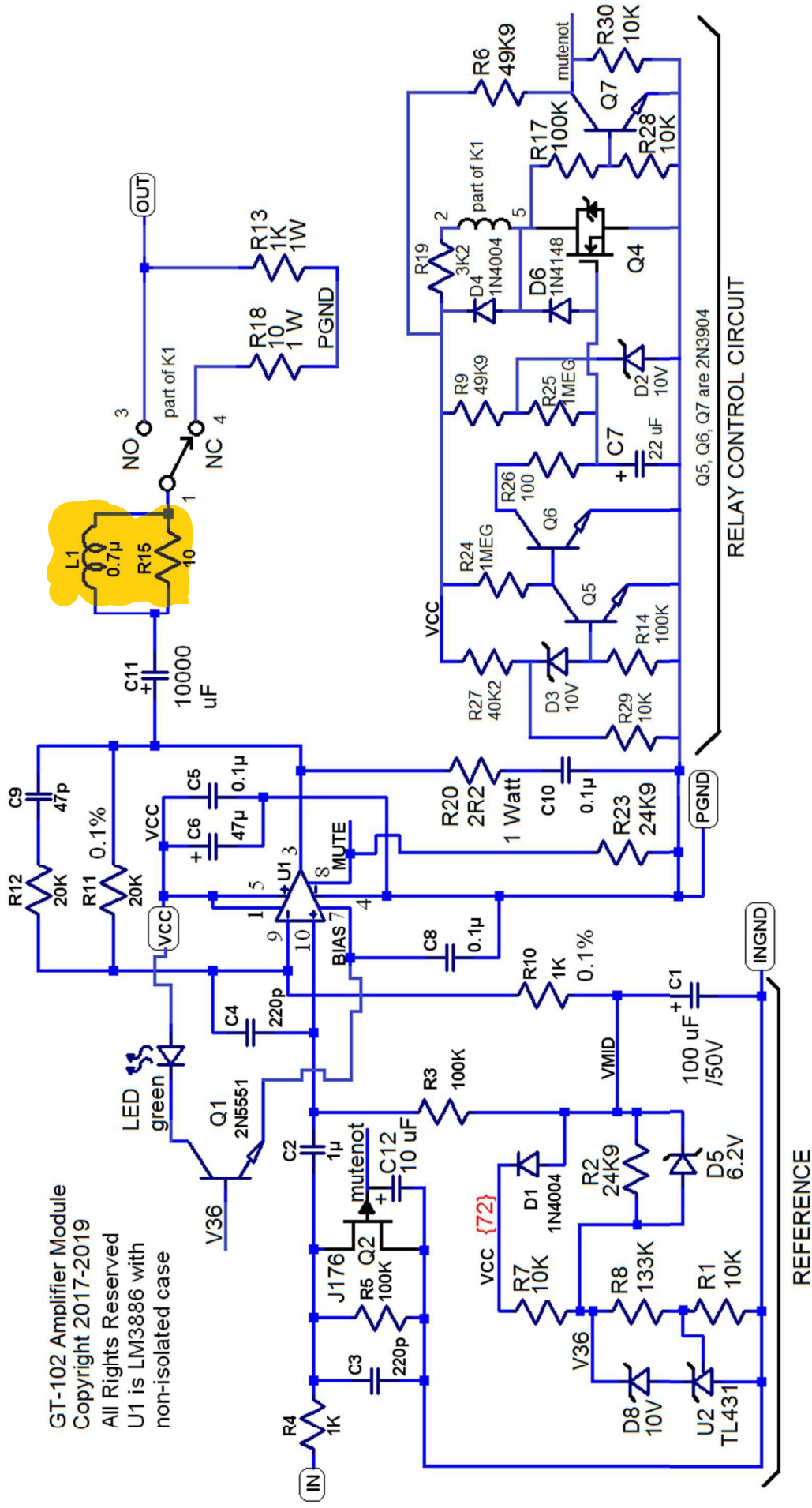


Figure 44-Amplifier Module Schematic

Notes:

1. As of this writing, R8 is 140K, which slightly improves centering of the output driver, resulting in slightly more output power before clipping.

Reference Voltage Generator

R1, R7, R8, D8, and U2 establish a 36-volt reference at node V36. D8 assures that 26 volts appears across U2, keeping it well within its 36-volt rating. R2 isolates V36. D5 helps charge C1 more quickly during turn-on, establishing the output voltage relatively quickly. V36 also sets the output voltage of the amplifier at 36 volts, half the supply rail. This is the optimum point to allow maximum linear output swing.

Q1 sets the required $\frac{1}{2}$ supply bias voltage on pin 7, the bias pin. The LED lights up as there's about 10 mA flowing in the bias pin, plus some signal dependent current.

Gain Setting Circuits

R11 and R10, 0.1% tolerance resistors, set the amplifier's gain so accurately that the amplifiers can be easily paralleled by paralleling the input pins and paralleling the output binding post. C4, C9, and R12 help keep the amplifier stable under all conditions. C1 sets the low frequency -3 dB point at 1.59 Hz. This keeps the signal across C1 in the audio band miniscule, assuring high linearity. The input -3 dB point is dominated by C2 and R3, at about 1.59 Hz.

R23 pulls a bit more than 1 mA out of the mute pin, assuring that the amp is not muted. C11, the output coupling capacitor, couples the amplifier's output to your speakers. L1, wound around C11, and R15 isolate capacitance in the speaker, also assuring stability for all load types. C11, at 10,000 μ F, makes a -3 dB point of 2 Hz when driving an 8 Ohm speaker (4 Hz when driving a 4 Ohm speaker).

Relay Control Circuit

K1 mutes the output of the amplifier during power up and power down. That avoids any pops or clicks during those times. R18 charges up C11 during the turn-on period. R13 keeps C11 discharged in the absence of a speaker load.

The relay control circuit keeps the relay open and the input muted until the power supply reaches about 53.5 volts. R27, R29, and D3 set this voltage. R24 and Q6 keep C1 discharged until the power supply exceeds 53.5 volts. After that, relay opening is further delayed by the charging time of C1 through R25. D2 sets a 10-volt bias voltage at the top of R25, making for a repeated turn-on delay.

D6 limits the gate voltage on Q4, which protects Q4, and provides consistent operation of the delay function. Q6 resets C1, the delay capacitor, when the power supply voltage drops below 53.5 volts. R26 limits C1's discharge current.

R17, R28, R6, R30, and Q7 control J176, a P-channel JFET that mutes the input whenever the power supply is less than 53.5 volts. C12 delays the muting function and allows it to smoothly be removed, making for a smooth transition from silence to sound.