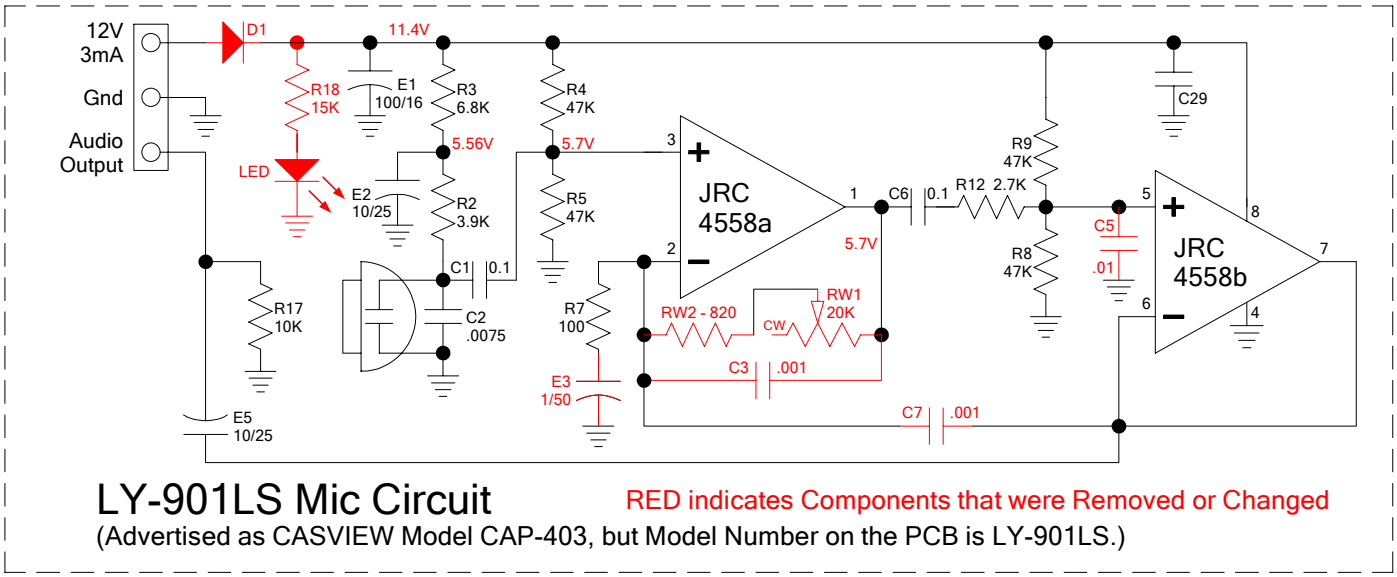
LY-901LS Electret Mic with Level Control

Dec 24 / 2015

Product ID: 2024368968 for $4.35 w/ free shipping (or 4 for $3.23 ea.)
from AliExpress Store: CCTV Surveillance Provider.



LY-901LS Mic Circuit

RED indicates Components that were Removed or Changed

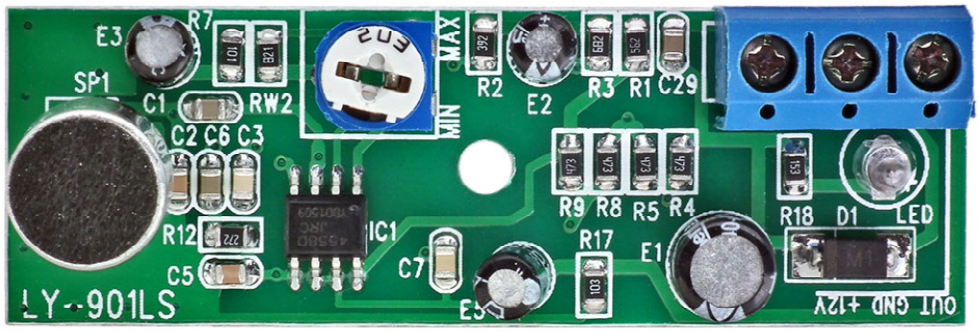
(Advertised as CASVIEW Model CAP-403, but Model Number on the PCB is LY-901LS.)

Measurements were made with a 5 mVp-p signal substituted for the mic. element and:

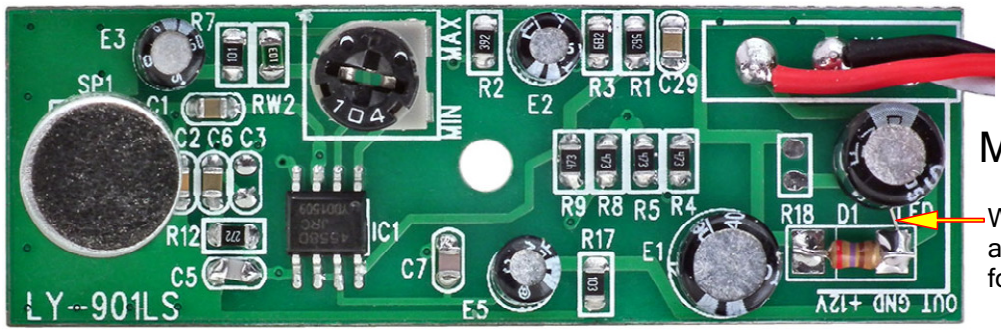
- with RW1 set for Minimum Gain:
  Maximum Output was 28mVp-p at 3.5 KHz, Gain was ≈ 5.6,
  3dB Frequency Response was ≈ 1 KHz – 10 KHz &
  6dB Frequency Response was ≈ 600 Hz – 17 KHz.

- with RW1 set for Maximum Gain:
  Maximum Output was 450mVp-p at 2.2 KHz, Gain was ≈ 90,
  3dB Frequency Response was ≈ 850 Hz – 5.5 KHz &
  6dB Frequency Response was ≈ 550 Hz – 8.3 KHz.

The reason for all the ≈ (approximately equal to symbols) is that the mic modifications didn't warrant spending additional time to obtain more precise measurements plus, as shown on page 2, the measured values for every circuit will almost always be slightly different anyway due to the slightly different component values in each circuit resulting from the component tolerances.



Un-Modified Circuit



Modified Circuit

Wire jumper between diode D1 anode pad and thru-hole for LED anode being used for + lead of the additional 100u capacitor.

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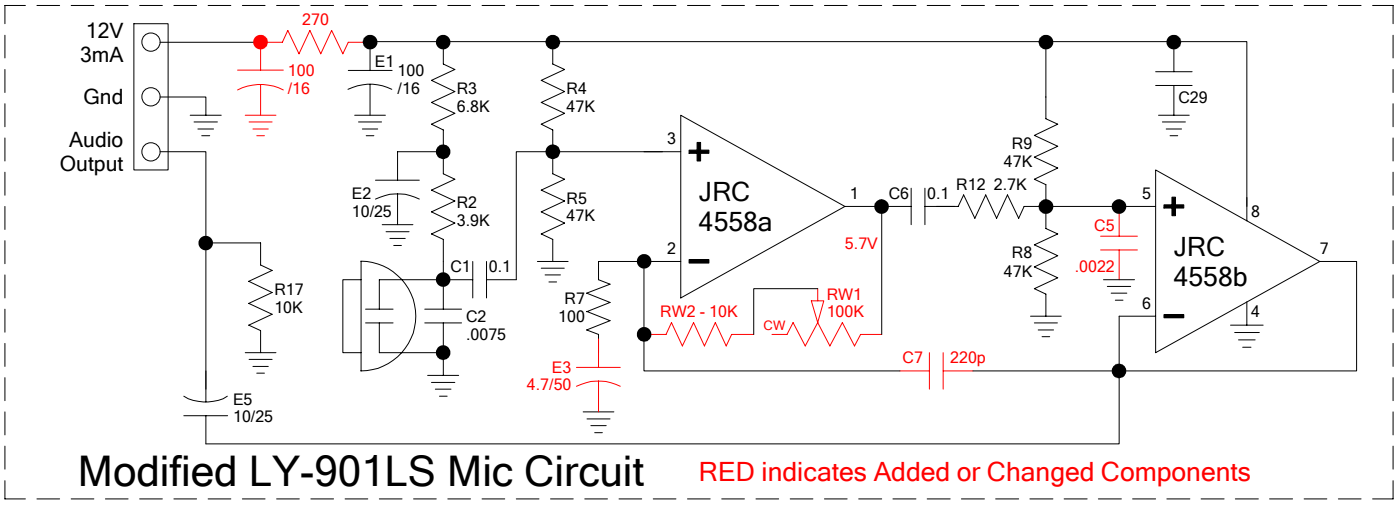

Modified LY-901LS Mic Circuit RED indicates Added or Changed Components

Modification: 1) Remove D1, R18, LED, C3, RW1, RW2, E3, C5 & C7.

2) Place one end of a small length of wire-wrap wire into the thru-hole that was for the LED anode and solder the other end to the pad that was for the anode of diode D1.

3) Install a 100u cap in the holes for a LED with the cap + lead in the LED anode hole with the wire jumper and solder in place.

4) Install a 270Ω resistor between the pads that were for diode D1.

5) Reinstall RW1, RW2, E3, C5 & C7 using components of a new value as per the modified schematic above.

The following measurements were made with a 5 mVp-p signal substituted for the mic and RW1 set for Maximum Gain after each additional component change was made to see the difference each change made.

1) With E3 = 4.7u the Maximum Output was at 1.2 KHz, Gain was ≈ 133,
3dB Frequency Response was ≈ 320 Hz – 4.0 KHz &
6dB Frequency Response was ≈ 200 Hz – 6.6 KHz.

2) With C3 removed - Maximum Output was at 1.4 KHz, Gain was ≈ 133,
3dB Frequency Response was ≈ 320 Hz – 5.4 KHz &
6dB Frequency Response was ≈ 200 Hz – 8.9 KHz.

3) With RW2 = 10K - Maximum Output was at 1.2 KHz, Gain was ≈ 196,
3dB Frequency Response was ≈ 320 Hz – 4.4 KHz &
6dB Frequency Response was ≈ 200 Hz – 7.2 KHz.

4) With RW1 = 47K - Maximum Output was at 1 KHz, Gain was ≈ 388,
3dB Frequency Response was ≈ 320 Hz – 3.0 KHz &
6dB Frequency Response was ≈ 200 Hz – 4.7 KHz.

5) With C7 = 560p - Maximum Output was at 1.2 KHz, Gain was ≈ 400,
3dB Frequency Response was ≈ 320 Hz – 3.7 KHz &
6dB Frequency Response was ≈ 200 Hz – 6.0 KHz.

6) With C7 = 220p - Maximum Output was at 1.4 KHz, Gain was ≈ 417,
3dB Frequency Response was ≈ 320 Hz – 5.2 KHz &
6dB Frequency Response was ≈ 200 Hz – 8.3 KHz.

7) With RW1 = 100K - Maximum Output was at 1.2 KHz, Gain was ≈ 809,
3dB Frequency Response was ≈ 320 Hz – 3.5 KHz &
6dB Frequency Response was ≈ 200 Hz – 5.5 KHz.

8) With C5 = .0022 - Maximum Output was at 1.2 KHz, Gain was ≈ 885,
3dB Frequency Response was ≈ 320 Hz – 4.0 KHz &
6dB Frequency Response was ≈ 200 Hz – 6.6 KHz.

A total of 4 LY-901LS Mic Circuits were modified and following are the final test results of each modified circuit.

Mic #1 - with RW1 set for Minimum Gain:
Maximum Output was at ≈ 3.4 KHz, Gain was ≈ 80,
3dB Frequency Response was ≈ 400 Hz – 21.5 KHz &
6dB Frequency Response was ≈ 230 Hz – 35.3 KHz.

- with RW1 set for Maximum Gain:
Maximum Output was at ≈ 1.2 KHz, Gain was ≈ 833,
3dB Frequency Response was ≈ 350 Hz – 4.0 KHz &
6dB Frequency Response was ≈ 220 Hz – 6.6 KHz.

Mic #2 - with RW1 set for Minimum Gain:
Maximum Output was at ≈ 3.2 KHz, Gain was ≈ 80,
3dB Frequency Response was ≈ 410 Hz – 21.5 KHz &
6dB Frequency Response was ≈ 250 Hz – 35.3 KHz.

- with RW1 set for Maximum Gain:
Maximum Output was at ≈ 1.1 KHz, Gain was ≈ 1010,
3dB Frequency Response was ≈ 350 Hz – 3.5 KHz &
6dB Frequency Response was ≈ 230 Hz – 5.7 KHz.

Mic #3 - with RW1 set for Minimum Gain:
Maximum Output was at ≈ 4.0 KHz, Gain was ≈ 83,
3dB Frequency Response was ≈ 450 Hz – 20.1 KHz &
6dB Frequency Response was ≈ 260 Hz – 34.0 KHz.

- with RW1 set for Maximum Gain:
Maximum Output was at ≈ 1.2 KHz, Gain was ≈ 866,
3dB Frequency Response was ≈ 370 Hz – 3.9 KHz &
6dB Frequency Response was ≈ 235 Hz – 6.2 KHz.

Mic #4 - with RW1 set for Minimum Gain:
Maximum Output was at ≈ 3.5 KHz, Gain was ≈ 84,
3dB Frequency Response was ≈ 440 Hz – 21.5 KHz &
6dB Frequency Response was ≈ 260 Hz – 35.5 KHz.

- with RW1 set for Maximum Gain:
Maximum Output was at ≈ 1.2 KHz, Gain was ≈ 963,
3dB Frequency Response was ≈ 370 Hz – 3.8 KHz &
6dB Frequency Response was ≈ 235 Hz – 6.2 KHz.

As expected, the results were slightly different for each circuit due to component tolerances.

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Mic #2 was later used to try and boost the high freq response a bit more by simply reducing the values of C5 & C7 even further and - with Mic #2 modified as per the modified schematic on page 2

- with RW1 set for Minimum Gain:
  Maximum Output was at ≈ 3.2 KHz, Gain was ≈ 80,
  3dB Frequency Response was 410 Hz – 21.5 KHz &
  6dB Frequency Response was 250 Hz – 35.3 KHz.
- with RW1 set for Maximum Gain:
  Maximum Output was at ≈ 1.1 KHz, Gain was ≈ 1010,
  3dB Frequency Response was 350 Hz – 3.5 KHz &
  6dB Frequency Response was 230 Hz – 5.7 KHz.

- with C7 further reduced to 100p
  - with RW1 set for Minimum Gain:
    Maximum Output was at 3.5 KHz, Gain was ≈ 80,
    3dB Frequency Response was 400 Hz – 24 KHz &
    6dB Frequency Response was 250 Hz – 38 KHz.
  - with RW1 set for Maximum Gain:
    Maximum Output was at 1.2 KHz, Gain was ≈1036,
    3dB Frequency Response from 370 Hz – 4.6 KHz &
    6dB Frequency Response from 240 Hz – 7.5 KHz.

- with C5 & C7 removed
  - with RW1 set for Minimum Gain:
    Maximum Output was at 7.0 KHz, Gain was ≈ 81,
    3dB Frequency Response was 400 Hz – 65 KHz &
    6dB Frequency Response was 250 Hz – 100 KHz.
  - with RW1 set for Maximum Gain:
    Maximum Output was at 1.7 KHz, Gain was ≈ 1130,
    3dB Frequency Response was 390 Hz – 6.8 KHz &
    6dB Frequency Response was 250 Hz – 11.2 KHz.

The additional changes made a bit of a difference to the numbers, but not enough to hear a difference plus the changes started to make the circuit unstable so Mic 2 was left modified as per the schematic.