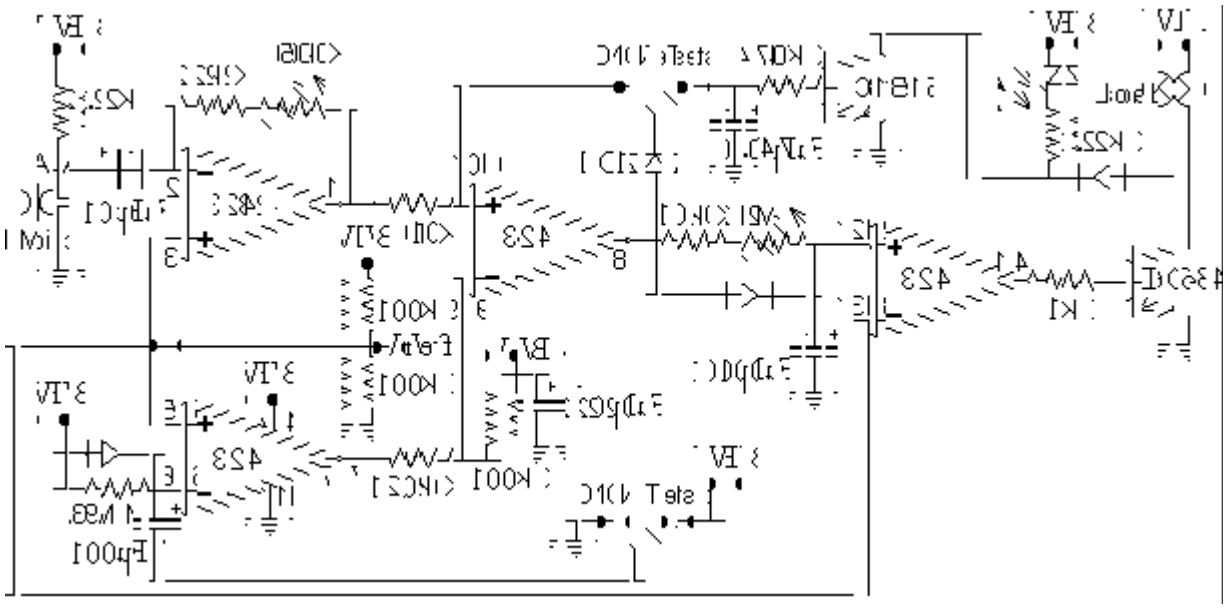
Voice activated circuit with delay



The Mic is carbon type with a series resistor equal to its nominal resistance.
It is recommended to use 100µF tantalum capacitors (instead of ordinary aluminum types). VB can be 6V with VL greater or equal VB.

Circuit analysis:

On steady state; the voltage at 1,2&3 is equal to Vref (why?).

Answer: On steady state the current in 500KΩ + 22KΩ is zero and the voltage at 1&2 are equal; from the other hand the voltage at 1 equal to the voltage difference between 2&3 multiplied by the gain of the Op Amp (of the order of 100000).

The voltage difference between 2&3 is then almost zero.

Voice will vary the resistance of the Mic below and over its nominal value, a varying voltage at A will result and this will be accompanied by a very small charging and discharging currents in the 10µF.

These (passing through 500KΩ + 22KΩ) will give significant voltage variations at 1.

The amplification is dependent on the value of 500KΩ (giving a variable sensitivity).

In Test position of the DPDT switch the lower 100µF is discharged (if has a charge), putting 6 at 6V,7 at 0V and 9 at slightly more than Vref.

If 1 (or 10) goes higher than 9; a +ve pulse is generated at 8,fastly charging the capacitor 0.47µF, putting C1815 and the LED ON (for a longer noticeable time).

We can then adjust the circuit sensitivity (at different voice levels) by watching the LED. This short pulse(s) will never put 12 higher than Vref so that D634 and Load cannot go ON (why?).

In ON position the lower 100µF is initially discharged, the voltage at 6 is zero, the voltage at 7 is approximately 5V and the voltage at 9 is more than 5V.

The voltage at 1 (or 10) cannot exceed 5V; then 8,12 and 14 cannot go high (i.e. the Load cannot go ON).

After about 6 min.s (safety time); 6 goes higher than 5 putting 7 at 0V.

Now once 1(or 10) goes higher than 9; 8 goes high and by the feedback diode D1; 10 goes higher than the last value then latching the voltage at 8 at about 5V.

The upper 100µF now starts charging and after a delay time (determined by the value of 2MΩ variable); 12 goes higher than Vref putting D634, the LED& the Load ON.

If we need to reactivate the safety time (after putting the switch to ON); put the switch to Test then to ON again.