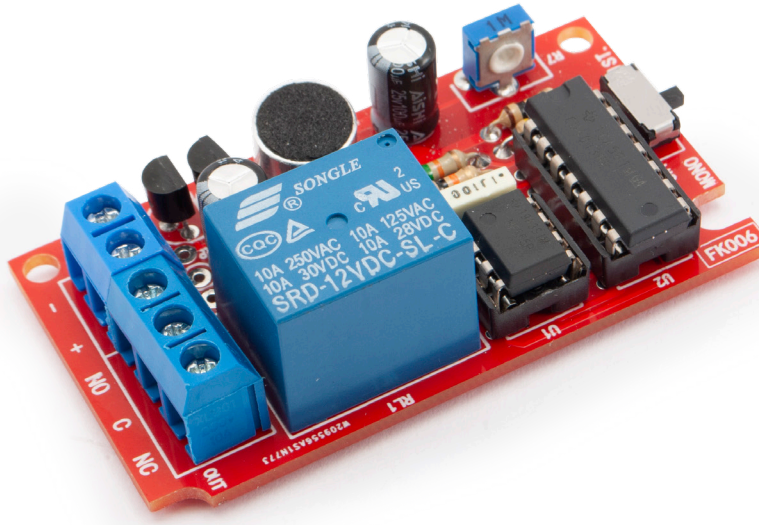
# CLAP SENSOR SWITCH *(cod. FK006)*




Switch capable of recognizing the sound of hand clapping (and similar sounds in terms of frequency spectrum) and activating an electrically powered device in either a monostable (timed) or bistable mode, all with few, inexpensive, and common electronic components.

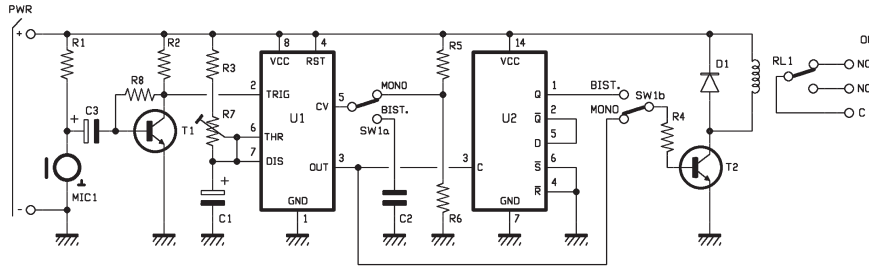
The hand-clap switch circuit consists of three blocks: an acoustic sensor based on a microphone and a transistor, a monostable multivibrator that generates well-defined duration pulses when triggered by the acoustic sensor, and a flip-flop, which allows implementing the bistable mode when desired.

The acoustic sensor is composed of an active-type electret condenser microphone capsule (with a JFET at the output) used to capture sounds and noises in the environment. Specifically, it captures the sound of hand clapping or the collision of two rigid or semi-rigid objects. The acoustic signal captured by the microphone's membrane (MIC1) is converted into a variable voltage, which is then amplified by the FET inside the capsule. The circuit is powered

## TECHNICAL SPECIFICATIONS

- **Power supply: 9-12Vcc**
- **Current comsumptione: 60mA**
- **Relay output with full exchange**
- **Switchable voltage: 250Vac**
- **Switchable current: 10A**
- **Monostable output mode or bistable**

## Electrical Diagram

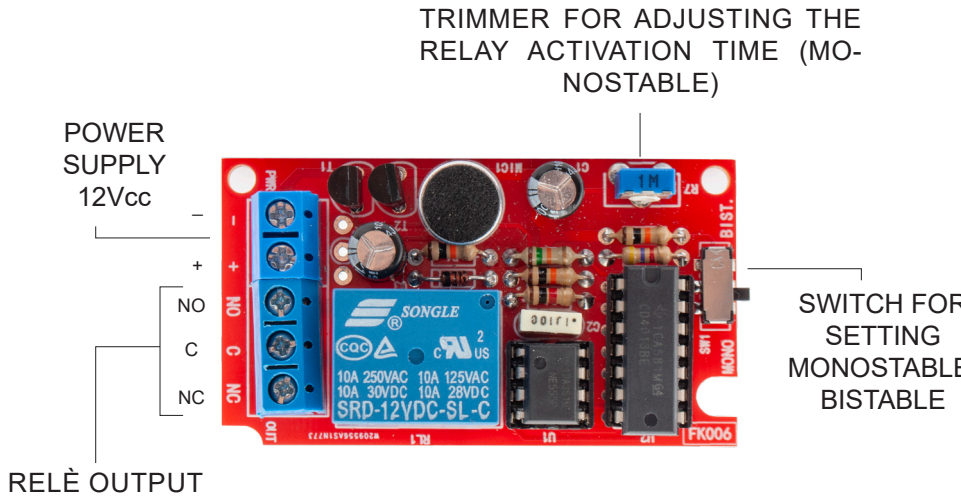



by direct current through the PWR terminal.

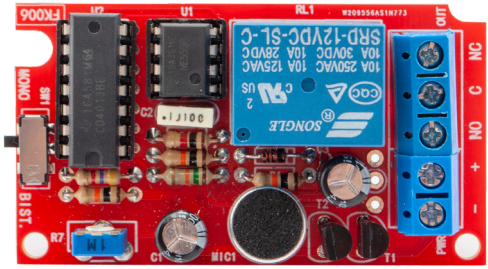
### Implementation and Installation

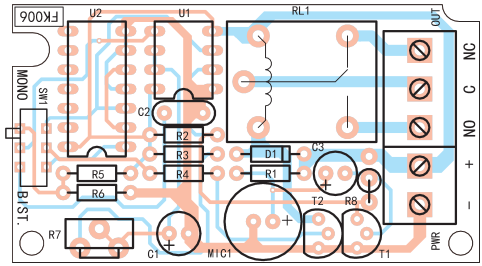
Begin the assembly of components with the resistors, silicon diode D1, and non-polarized capacitors. Then, proceed with the 555 and 4013 integrated circuits, which can be mounted on a 4+4 pin DIP socket (insert the ICs once you have soldered all other components). Next, move on to the NPN transistor, followed by the 5mm pitch terminal blocks, electrolytic capacitors (C1 and C3), and the relay, ensuring the correct orientation.

Regarding the microphone connection, it can be soldered directly onto the printed circuit board. However, for optimal use, it's advisable to enclose the electronics in a container and extend the microphone externally using a desired length of wire, preferably shielded. This helps prevent false activations caused by any noise generated by the electronics itself. Typi-



## [assembly **PLAN**]




**Component list:**

R1, R3, R6: 10 kohm
R2: 1 kohm
R4: 15 kohm
R5: 4.7 kohm
R7: 1 Mohm MV (Trimmer)
R8: Not specified
C1, C3: 100 µF 16 VL electrolytic
C2: 100 nF 63 VL polyester
D1: 1N4148
T1, T2: BC547
U1: NE555P
U2: CD4013BE
RL1: Relay 12V/10A 1 changeover contact
MIC1: Preamplified microphone capsule ø 10 mm

Various components:
2-way slide switch (Deviatore slitta)
2-pin terminal block with 5 mm pitch (Morsetto 2 poli passo 5 mm)
3-pin terminal block with 5 mm pitch (Morsetto 3 poli passo 5 mm)
4+4 pin socket (Zoccolo 4+4)
7+7 pin socket (Zoccolo 7+7)
9V battery clip (Clip batteria 9V)
Printed circuit board FK006 (62x40 mm)

cally, the negative pole of the microphone is identified because it is electrically connected to the container.
The choice of the placement of the electret capsule depends on the desired installation type, whether you want the sound of clapping hands or other excitation noise to be detected near or far from where the load wiring is located. For the orientation of polarized components, refer to the assembly drawing visible at the top of this page.

### *Clap Switch Use*

The circuit is ready for use and does not require any preliminary adjustments, except for the trimmer that sets the duration of the monostable pulse (or trigger of the flip-flop) and the selection of the operating mode through the double switch.

For installation, remember that the relay's switch can be used to interrupt one of the wires (if it is an alternating current, we recommend the phase wire, which should be identified beforehand using a voltage tester) for the load's power supply. Keep in mind the voltage and current limits specified in the technical specifications provided at the beginning of the article.

For use, in monostable mode, move switch SW1 to the “MONO” position. You can then adjust the trimmer to set the time after which the relay will return to the resting state. Clapping hands will trigger the output, and after the set time elapses, the output will return to the resting state. The activation time can vary from 1 second to 110 seconds.

In bistable mode, move switch SW1 to the “BIST” position, and trimmer R5 should be turned fully counterclockwise to minimize resistance. This is done to achieve a very short period and allow for consecutive commands, considering that the minimum time interval between claps cannot be shorter than the duration of the pulse produced by the monostable implemented by the 555 timer. In bistable mode, one clap will toggle the output, and another clap will return it to the resting state.

The complete article of the project was published in: ElettronicaIn issue no. 266.

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