

# MUSCULAR STIMULATOR

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**H**ere is a circuit that stimulates nerves of that part of your body where electrodes are

attached. It is useful to relieve headache and muscular pain and revive frozen muscles that impair movement. Though it provides muscles stimulation and invigoration, it's mainly an

aid in removing cellulitis.

The system comprises two units: muscular stimulator and timer.

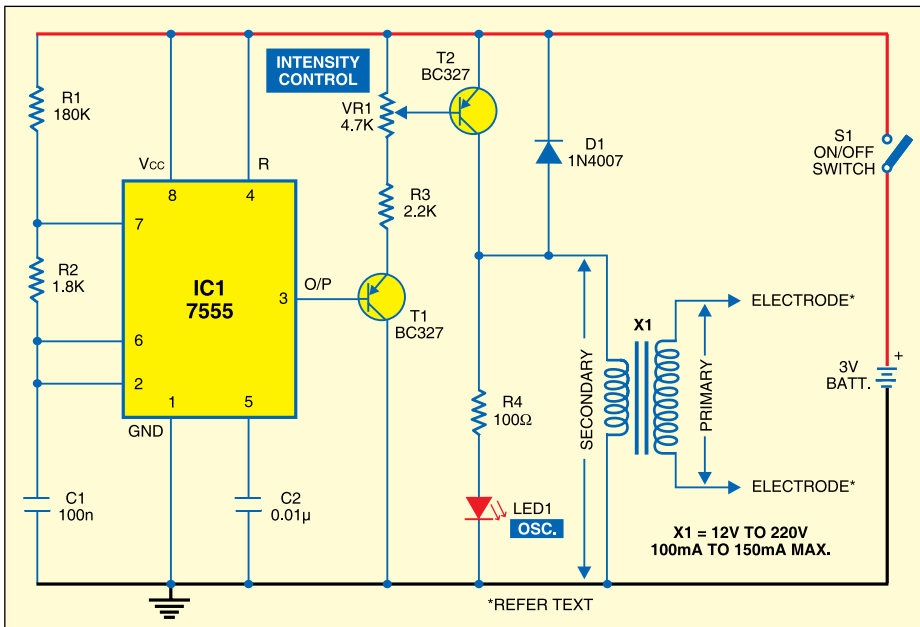


Fig. 1: Muscular stimulator circuit

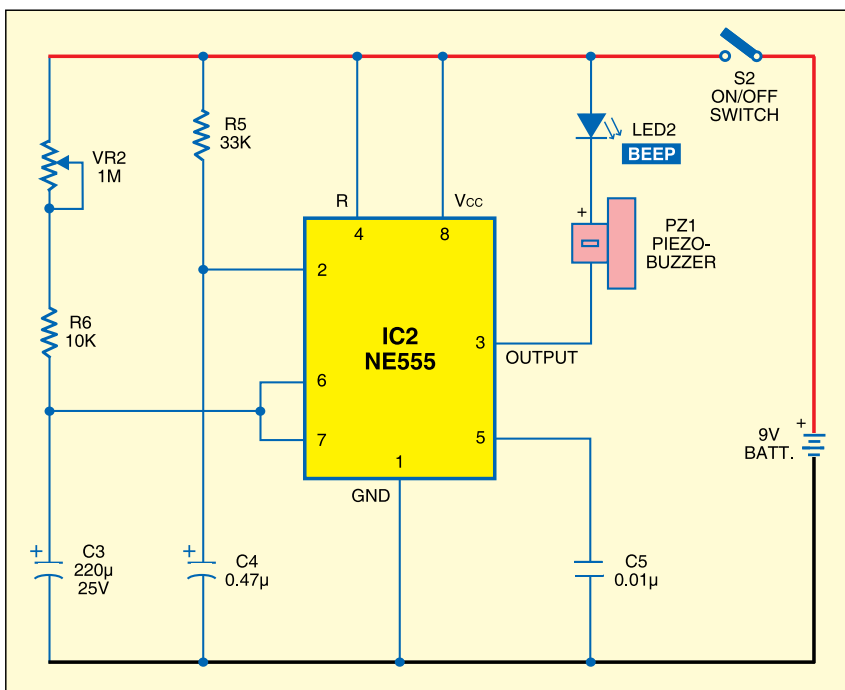


Fig. 2: Timer circuit

Fig. 1 shows the circuit of the muscular stimulator. IC 7555 is wired as an astable multivibrator to generate about 80Hz pulses. The output of IC1 is fed to transistor T1, whose emitter is further connected to the base of transistor T2 through R3 and VR1. The collector of transistor T2 is connected to one end of the secondary winding of transformer X1. The other end of the secondary winding of the transformer is connected to ground.

When IC1 oscillates, transformer X1 is driven by the pulse frequencies generated to produce high voltage at its primary terminals. Separate electrodes are connected to each end of the primary winding of transformer X1. Diode 1N4007 (D1) protects transistor T2 against high-voltage pulses generated by the transformer.

Using potmeter VR1 you can control the intensity of current sensing at the electrodes. The brightness level of LED1 indicates the amplitude of the pulses. If you want to increase the intensity level, replace the 1.8-kilo-ohm resistor with 5.6 kilo-ohms or higher value up to 10 kilo-ohms.

X1 is a small mains transformer with 220V primary to 12V, 100/150mA secondary. It must be reverse connected, i.e., connect the secondary winding to the collector of T2 and ground, and primary winding to the output electrodes. The output voltage is about 60V but the output current is so small that there is no threat of electric shock.

Electrodes are made of small, thin-gauge metallic plates measuring about 2.5×2.5 cm<sup>2</sup> in size. Use flexible wires to solder electrodes and connect to the

output of the device. Before attaching metal electrodes to the body, wipe them with a damp cloth. After attaching the electrodes to the body (with the help of elastic bands on velcro straps), flip switch S1 to activate the circuit and rotate the knob of intensity-control preset VR1 very slowly until you feel a slight tingling sensation.

Fig. 2 shows the timer circuit. It uses IC NE555 wired in monostable mode. Initially, when you press switch

S2, the monostable triggers and its output goes high for 10 minutes. Thereafter, its output goes low to give a beep sound from the piezobuzzer and lights up the red LED (LED2) indicating that stimulation time is over.

Assemble the timer with a separate switch and a 9V DC battery in the same cabinet as the stimulator. Tape the electrodes to the skin at opposite ends of the chosen muscle and rotate VR1 knob slowly until you sense light itching

when the muscular stimulation circuit is powered on. At the same time, flip switch S2 to start the timer for counting the time. At the end of the timing cycle, the piezobuzzer beeps. Each session should last about 10 minutes.

**Caution:** Heart patients and pregnant women should not use this device. Also, do not attach electrodes to burns, cuts, wounds or any injury. Consult your physician before using this circuit. ●