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(/wp-content/uploads/2009/03/muscle-stimulator.jpg)

Electronic Muscle Stimulation

P. MARIAN (HTTPS://WWW.ELECTROSCHEMATICS.COM /AUTHOR/ADMIN/)

(https://www.facebook.com/sharer/sharer.php?u=https://www.electroschematics.com/2083/electronic-muscle-stimulator/) (https://twitter.com/share) (/qa/)

This is an electronic muscle stimulator circuit that stimulates nerves of that part of your body where electrodes are attached. It is useful to relieve headache and muscle pain and revive frozen muscles that impair movement. It's mainly muscle stimulation aid is removing cellulitis and build up you muscles.
Can be used for diy electro stimulation.

The system comprises two units: **muscle stimulator and timer**.

Fig. 1 shows the circuit of the muscle stimulator. IC 7555 is wired as an astable multivibrator to generate about 80Hz pulses.

Using potentiometer 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 1.8kΩ resistor with 5.6kΩ or higher value up to 10kΩ.

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.

Want to buy one?

- XFT-320A (http://www.amazon.com/XFT-320A-Electrical-Massager-pads-Acupuncture/dp/B008IJGN42 /?_encoding=UTF8&camp=1789&creative=9325&linkCode=ur2&tag=electrocirc07-20) – starting from $25
- Slendertone Revive (http://www.amazon.com/Slendertone-0561-5002-Revive-Muscle-Conditioner/dp/B001G93XZ8 /?_encoding=UTF8&camp=1789&creative=9325&linkCode=ur2&tag=electrocirc07-20) – from $75
- Compex Performance (http://www.amazon.com/Compex-Performance-Muscle-Stimulator/dp/B003BG2QXY /?_encoding=UTF8&camp=1789&creative=9325&linkCode=ur2&tag=electrocirc07-20) – from $580

Schematic of the DIY Muscle Stimulator Circuit
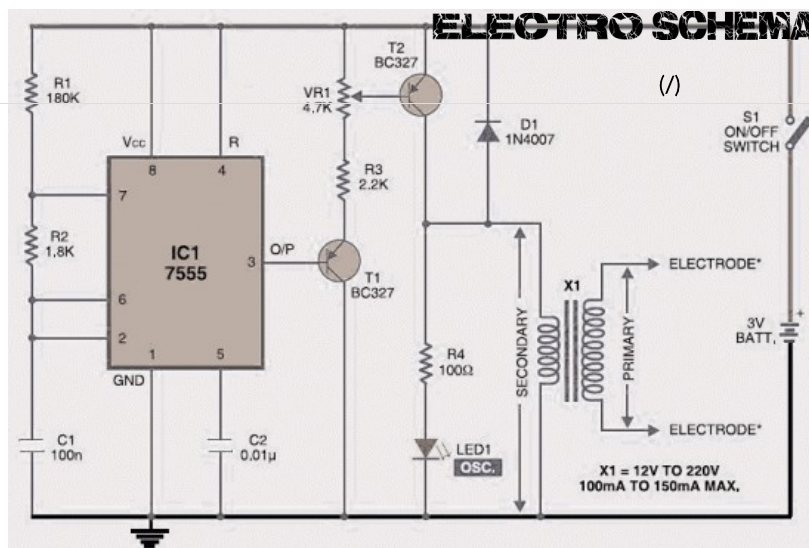
(https://www.electroschematics.com/wp-content/uploads/2009/03/electronic-muscle-stimulator.gif)
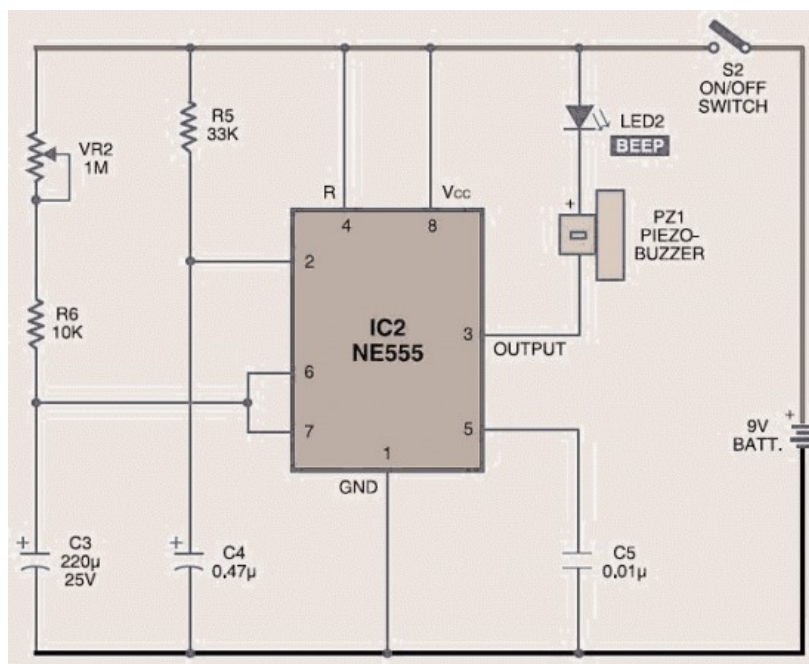
555 datasheet (https://www.electroschematics.com/650/lm555-datasheet/)
Electrodes are made of small, thinguage metallic plates measuring about 2.5×2.5 cm2 in size. Use flexible wires to solder electrodes and connect to the output of the device. Before attaching metal electrodes to the body, wipe them 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 muscle stimulation time is over.

Schematic of the Electronic Muscle Stimulation Timer

(https://www.electroschematics.com/wp-content/uploads/2009/03/muscle-stimulator-timer.gif)

555 datasheet (https://www.electroschematics.com/650/lm555-datasheet/)

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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 muscle 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.

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c2jpog (/)

it works wonderfully, just use a 1k for R1, 180k is too much,

Posted on September 03rd 2016 | 7:35 pm (https://www.electroschematics.com/2083/electronic-muscle-stimulator/#comment-1901231)

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aqsa123

why the transformer is not giving the required output voltage??
n is mains transformer is another type of transformer or it is the ordinary one?

Posted on October 06th 2015 | 3:00 pm (https://www.electroschematics.com/2083/electronic-muscle-stimulator/#comment-1823152)

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maha niaz

what kind of wave is generating at output of transformer where we need to connect electrodes?

Posted on September 11th 2015 | 6:24 pm (https://www.electroschematics.com/2083/electronic-muscle-stimulator/#comment-1793904)

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bb

I would say the transformer is in backwards in the schematic. You want the electrodes on the secondary and the transistor on the primary.

Posted on September 07th 2015 | 1:42 am (https://www.electroschematics.com/2083/electronic-muscle-stimulator/#comment-1787382)

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Ahmed

How much is the output current?

Posted on August 10th 2015 | 8:51 am (https://www.electroschematics.com/2083/electronic-muscle-stimulator/#comment-1759249)

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kuldeep   (/)

this circuit is not working plz help me its very urgent

Posted on August 18th 2014 | 7:52 pm (https://www.electroschematics.com /2083/electronic-muscle-stimulator/#comment-680927)

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Wayne

Just buy the XFt-320 from Amazom. Get some extra pads. Check out the Paradise Electrode Stimulator for real torture.

Posted on November 27th 2013 | 9:49 pm (https://www.electroschematics.com /2083/electronic-muscle-stimulator/#comment-274171)

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shehan

working great with 555 IC need to learn more. What i need is a high frequency.

Posted on October 21st 2013 | 9:03 pm (https://www.electroschematics.com /2083/electronic-muscle-stimulator/#comment-273681)

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jazzel

i tried making the circuit with the same components, except that i used 220-12V, 200mA center-tapped transformer. but the results are different. the output voltage to the electrode is just 1.2V. what seems to be the problem.

Posted on September 05th 2013 | 1:23 pm (https://www.electroschematics.com /2083/electronic-muscle-stimulator/#comment-273157)

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sjack

I just did that. I put a 10kΩ for R2 and now I can definitely feel the current… through my skin. Isn't it supposed to twitch your muscles? All I can feel is a nasty sensation of being electrocuted.

Posted on August 26th 2013 | 11:20 am (https://www.electroschematics.com /2083/electronic-muscle-stimulator/#comment-273053)

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Drab　　　　　　　　　　　　　　　　(/)

Popescu Marian – read your reply about using high voltage DC with 2mA

Can this be made using arduino to control the PWM?
Can you specify the voltage of the DC transformer you talked about and maybe show a diagram of some sort

thnx

Posted on February 02nd 2015 | 4:05 pm
(https://www.electroschematics.com/2083/electronic-muscle-stimulator
/#comment-1492616)　　　　　　　　　　　　　　　　　　　↰

Popescu Marian

You need to lower the frequency if you want to contract the muscles. For example a 5 Hz frequency will contract and relax your muscles twice per second, but now you'll have a problem with the transformer.

Another way of making a muscle stimulator would be to use high DC voltage with limited current (max 2 or 3 mA) and control the length of the pulse. It is kind of duty cycle control (PWM) where you control how long the pulse stays HIGH and LOW and you won't need the transformer anymore therefore you can reach lower frequencies (0.1Hz) and better muscle stimulation.

Posted on August 29th 2013 | 5:34 pm (https://www.electroschematics.com
/2083/electronic-muscle-stimulator/#comment-273092)　　　　　　　↰

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