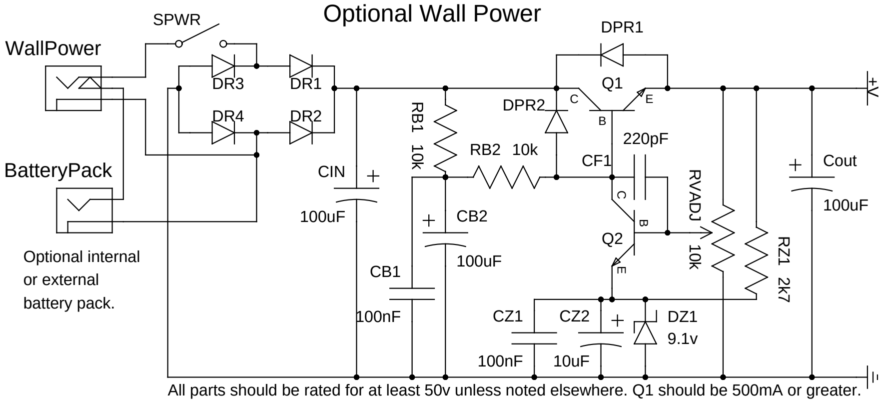
Enhanced Dr. Bob Beck Biological Electrifier and Silver Colloid Generator

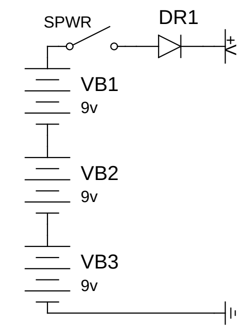
2014−07−12
For private,
experimental,
and small run
educational
use only.

Optional Wall Power

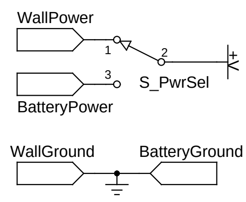


All parts should be rated for at least 50v unless noted elsewhere. Q1 should be 500mA or greater.
Adjust RVADJ until output voltage is 30v. Do not go over 30v or the LM358 will blow.

Optional Battery Power

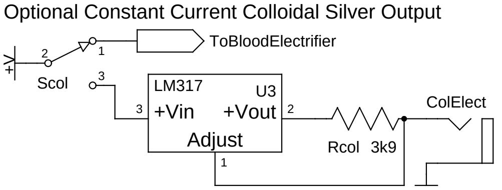


Optional Power Select (Wall or Battery Power)



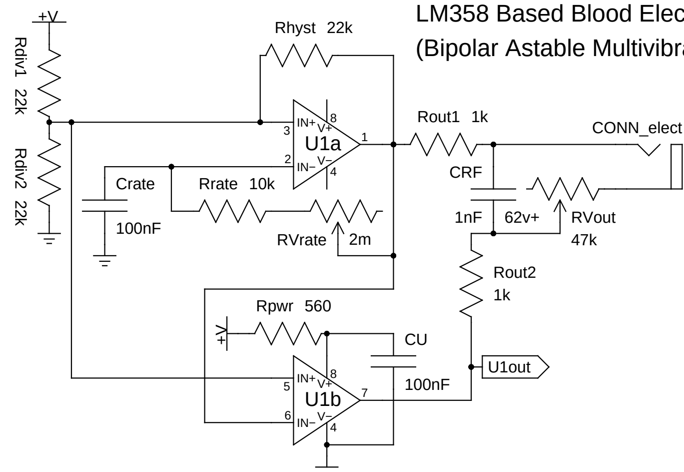
Slightly less voltage drop can be had by manually switching between wall power and battery power.

Optional Constant Current Colloidal Silver Output

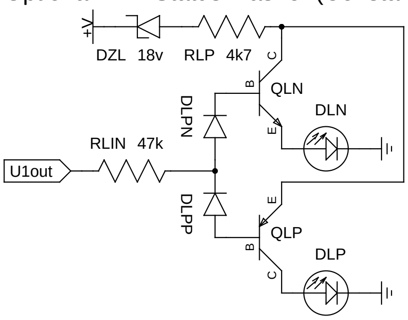


Plug electrodes in and connect those to the silver wire. The LM317 is in constant current mode. Around 2mA output requires a 3.9k resistor. There is some trial and error involved with different currents. Test accordingly. The equation "should" be: Rcol = Vref / I. Vref is the Adjust pin voltage of 1.25v and I is the desired current. The equation breaks down with higher resistances / lower currents.
This sub−circuit could be broken out for independent use. Do not go over 40v DC or the LM317 will blow. If the voltage is always the same, the LM317 could be removed and Rcol could be set to 2mA using the formula: Rcol = Vsupply / 0.002
I make colloidal silver by the half gallon. My electrodes are submerged about 5 inches in the distilled water, 1.5 inches apart, stirred with a slow turning motor, and are fed with a 39v wall wart. It takes about 5 hours to complete. Finish voltage across the silver wires is around 10v. If the solution starts turning light green with the constant slow stir or light yellow with a periodic stir (larger particle clumps), stop the process and take notes that next time should be shorter with a slightly higher finish voltage for you. The finished product shouldn't have any color and should not be cloudy beyond the Tindall effect.

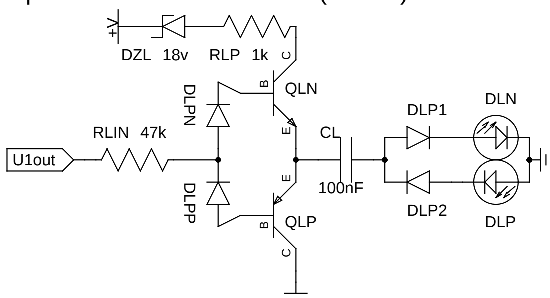
LM358 Based Blood Electrifier (Bipolar Astable Multivibrator)



Optional LED Status Flasher (Constant)



Optional LED Status Flasher (Pulsed)



Enhanced Dr. Bob Beck Biological Electrifier (Transistor Version)

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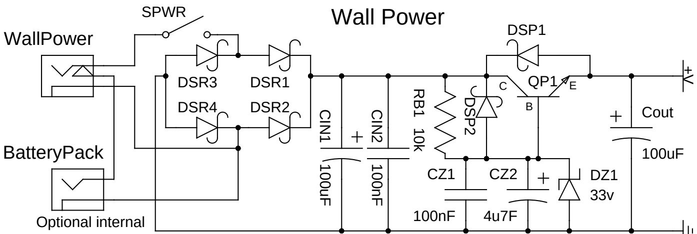
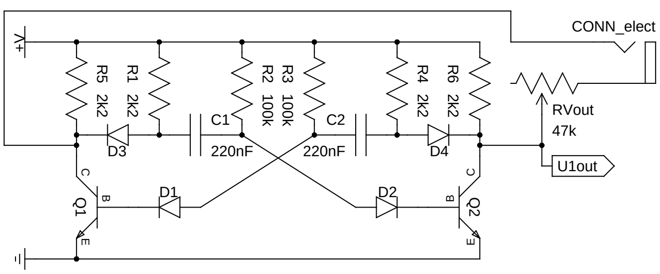


Optional internal or external battery pack. Use 3−4x 9v batteries in series.

Power supply parts should be at least 50v rated. QP1 should be 500mA or higher.
Other parts should be at least 50v rated unless noted on the schematic.
DZ1 turns QP1 into a fixed voltage regulator over the zener voltage.
To allow for higher voltages, increase DZ1's value. Note that the voltage ratings of the other parts will also have to be increased.

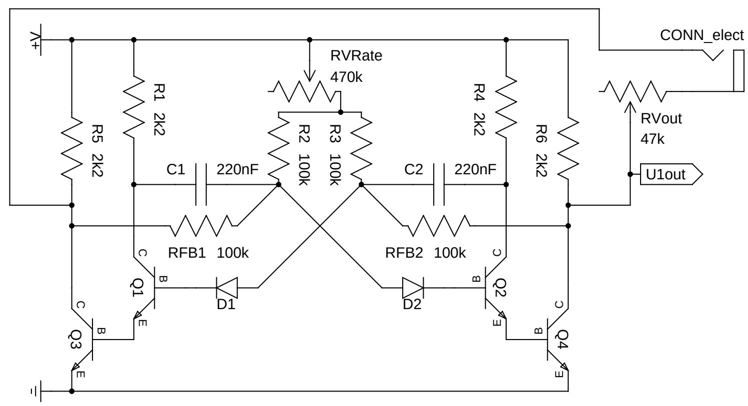
Fixed Frequency Blood Electrifier (Bipolar Astable Multivibrator)



Choose this circuit for fixed frequency. Variable frequency versions of this circuit do not work.
Choose the other one for variable. If a low frequency is chosen, beware of transfection issues.
Timing is determined by the C1+R2 and C2+R3 pairs. Symmetrical square waves: C1=C2, R2=R3.
R1, R4, R5, and R6 (capacitor charge) should be less than R2,R3 (capacitor discharge).
Charge Path: Supply to R1 to C1 to D2 to Q2 base to Q2 emitter to ground.
Discharge Path: Supply to R2 to C1 to D3 to Q1 collector to Q1 emitter to ground.
D1 and D2 (1n4148) protect the transistor bases from excessive reverse voltage that would blow them.
R5, R6, D3, and D4 are used to make the square wave a proper square. R5=R1, R4=R6
Frequency math: Freq = 1 / (1.38 * R * C) Where R2=R3 is R and C1=C2 is C.
If the R1 to R6 resistors are too high, there might not be enough current for the transistors to activate.
In this situation, the circuit may lock up. Using the LED flashers is highly recommended.
Quick Frequency Table (choices for C1, C2, R2, R3):
220nF: 100k=33Hz, 470k=7Hz
470nF: 47k=33Hz, 470k=3Hz
680nF: 33k=33Hz, 360k=3Hz
1uF: 22k=33Hz, 220k=3Hz

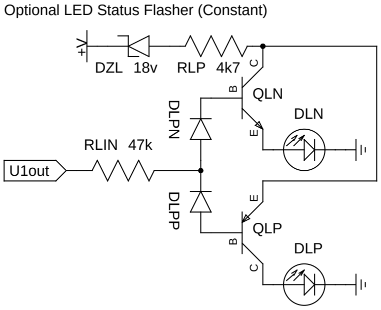
A full transistor version can handle higher voltages and get the square wave closer to the power rails.
Note that this doesn't always mean a better treatment. Voltage too high can damage cells.
Voltage too high can electrolysis crack water in arteries and veins and create dangerous air bubbles.
A full transistor version does not use an op−amp like the LM358 and may be easier for some to build.
The higher voltages do not allow for the constant current colloidal silver sub circuit in the other design but can still use a fixed resistor in place of it.
Be sure to check parts ratings carefully when using higher voltages.

Variable Frequency Blood Electrifier (Bipolar Astable Multivibrator)

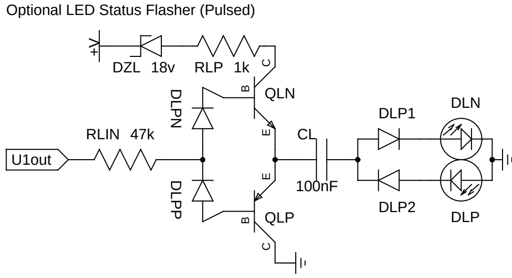


Choose this circuit for variable frequency. If a low frequency is constantly used, beware of transfection issues. 30Hz and above is generally considered much safer.
Transistor astable multivibrators respond poorly to variable frequency control used by RVRate.
The RFB regenerative feedback resistors and Q3+Q4 (quasi−Darlington) are used to clean up a "bouncy" square wave that results. The trailing edge of the square wave is still rounded but is usable.
An untested idea is to use a triple transistor darlington to fix the trailing edge square wave roll off.
Note that RVRate tends to go from a slow frequency to the max frequency quickly. The LM358 version has a much more linear frequency control.
Timing is determined by the C1+R2 and C2+R3 pairs with RVRate. Symmetrical square waves: C1=C2, R2=R3.
RVRate changes the frequency but not the pulse spacing. Choose R2 and R3 for max freq values.
Choose RVRate for the slowest frequency.
R1, R4, R5, and R6 (capacitor charge) should be less than R2,R3 (capacitor discharge).
Charge Path: Supply to R1 to C1 to D2 to Q2 base to Q2 emitter to Q4 base to Q4 emitter to ground.
Discharge Path: Supply to RVRate to R2 to C1 to Q1 collector to Q1 emitter to Q3 base to Q3 emitter to ground.
D1 and D2 (1n4148) protect the transistor bases from excessive reverse voltage that would blow them.
Frequency math: Freq = 1 / (1.38 * R * C) Where R2=R3 is R and C1=C2 is C.
If the R1 to R6 and RVRate resistors are too high, there might not be enough current for the transistors to activate. In this situation, the circuit may lock up. Using the LED flashers is highly recommended.
Quick Frequency Table (choices for C1, C2, R2, R3, and RVRate):
220nF: 100k=33Hz, 470k=7Hz, Together=6Hz
470nF: 47k=33Hz, 470k=3Hz, Together=3Hz
680nF: 33k=33Hz, 360k=3Hz, Together=3Hz
1uF: 22k=33Hz, 220k=3Hz, Together=3Hz

Optional LED Status Flasher (Constant)



Optional LED Status Flasher (Pulsed)



Common NPN Transistors:
2n5210t 50v 100mA b=350
bc546b 65v 100mA b=300
ksc1815y 50v 150mA b=170
mpsa05ra 60v 500mA b=170
2n6517ta 350v 500mA b=150

Enhanced Dr. Bob Beck Biological Electrifier and Colloidal Silver Generator

Some parts have been changed from the original Beck design, but this is still just a bipolar astable multivibrator with hysterisis. There have been a number of fixes and enhancements made.

Usage: 3.915-30Hz square wave at 50-100uA. Voltage should be 60v p-p or higher. In reality, it will be lower due to some losses. 3x 9v batteries will only do 54-57v p-p at best (36v p-p when low). Electrodes go on the fore arm just before the wrist (looking at it palm facing up). On each side there should be an indentation where the pulse can be felt. The electrodes go there. Note that my skin will get mild electrical burns. This is probably to be expected given the voltage and time. So far they are harmless.

Three ideas on results: (1) This thing is killing off latent infections as advertised. (2) Energy is being put into chemicals in the blood and transfection is making them more readily available. (3) Energy being put into blood chemicals is burning off the leftovers and is help cleansing the body.

A word about putting energy into a system: Energy doesn't magically select one thing over another. When energy is put into a system, everything that passes through gets affected. For good things, they become better. Too much of a good thing can become bad, though. For bad things, they become worse. If you have an overly negative reaction, don't throw this away. Consider getting screened for blood toxins and heavy metals. Properly fix the problem at its source and then try again. Do NOT use this with mercury dental fillings.

Note: Clean off all the excess solder flux around the electrifier circuit. With such small currents, it could mess with the timing part and give results that are too fast.

The output connectors aren't critical so long as they have the correct number of terminals. I tend to use 1/8" mono connectors since they are cheap and easy to find.

Wall power and battery power schematics are shown. Choose one or both depending on your needs. Methods of switching between them are also shown. Just be sure to not exceed the voltage rating of the op-amp or it will be blown.

The original Beck schematic showed an LED 22uF/25v non-polarized capacitor. In reality these are very large and expensive at this rating. I've seen other schematics use a straight electrolytic, but the reversing polarity will kill these quickly. To make a non-polarized electrolytic, get 2x at double the needed value and solder their negative leads together (capacitors in series drop the total capacitance). Since the 18v zeners drop the voltage down to 9-12v for the LED, 2x 16 volt rated capacitors could be used, but higher voltage rating is much safer. Another problem with putting the LED's directly in line with the output is that they will suck away power and deform the square wave. I changed this to 2 different flashing LED drivers so the output would be independent and unaffected. One has the flashing constantly on and the other uses a pulsed flash. Choose whichever one you prefer.

Rdiv's. If U1a is hooked up to the positive lead and U1b is hooked up to the negative, Rdiv2 controls the width of the top/positive part of the waveform, and Rdiv1 controls the bottom. Smaller values are shorter pulse widths. Minimum value is 1k5, max around 100k.

Rout's were split from one to two. This provides slightly better balance to the op-amp's and also offers some static protection to the U1a op-amp output (this is touching skin directly).

Rhyst is the positive feedback resistor. Smaller values will make a slower clock (minimum 1k5, max around 150k).

RVRate replaced the original 2.4meg ohm resistor to allow for variable rates. A minimum rate resistor Rrate was added to avoid making the clock go too fast. RVRate can also be used to tune the box much closer to 7.83Hz/2 (3.915Hz) if desired (or other frequencies; not critical). Higher resistance makes a slower clock (up to about 2meg ohm). The power going through RVRate charges and discharges Crate to set the frequency.

CRF is a filter capacitor to remove overshoot and ringing on the square wave. This can get pretty bad with some op-amps. Since DC current is only desired with this circuit, overshoot noise and ringing does nothing (but probably harms the skin, pins and needles). CRF needs to be rated for the full peak to peak voltage (at least 63v).

For the "Optional Wall Power" circuit, C*, DR*, and Q* should be 50v rated or higher. Q* should be 500mA rated. RVADJ will need a volt meter to adjust it to the desired voltage out (30v for the LM358 op-amp). The input voltage should be +5v higher than the desired output voltage for reliable regulation. If the raw input voltage is significantly higher than the regulated output voltage, Q1 will need a heat sink and may need to be 1-2A rated or higher. A resistor between DR1+DR2 and CIN could help with Q1's heat regulation. Values could range 56-560 ohm. The DR* diode bridge will allow for DC or AC input and any polarity on a DC connector.

For wall power, it can often be difficult to find a 35v DC power supply. An easier option is to make use of the diode bridge and get a 24VAC power supply. When DC rectified it should be about right for the 30v regulator.

U1 is at least a single rail, 30v rated dual op-amp (rail-to-rail preferred). An LM358 is used in the original schematic. An LM258 seems to work fine. I used an OPA2134 for testing with semi-unreliable results. An NE5532 will not work.

U1 has a resistor (Rpwr) at the voltage in to drop current to the op-amp. This helps avoid it form over heating and over loading. It also helps with short circuit protection.

Larger values for Crate will slow the slew rate on the leading pulse edge and should be avoided. Regardless of size, the leading pulse top corner is slightly bent. Large Crate values (uF range) will also start bending the leading pulse edge.

Read this FAQ: http://altered-states.net/barry/newsletter133/beckq&a.htm

Warnings: When doing blood electrification at around 4Hz, blood cells can absorb chemicals around 20 times more efficiently (transfection). Even with good chemicals being absorbed, this can become toxic and dangerous. With prescription drugs in the system, this can become very dangerous. Transfection is much less of an issue with frequencies between 30-90Hz. Transfection seems to be strongest at 1Hz. 4Hz causes a third as much. At 30Hz, it is less than 1% and still nearly as strong as 4Hz for killing infections. 90Hz will have even less transfection, but is less potent than 30Hz. Frequencies less than 4Hz down to DC are dangerous as they can create free floating oxygen bubbles due to electrolysis. Electrolysis itself is also dangerous.

Observations:

Banana plugs could be used for electrode tips. Just be sure that the lead soldered point is not in contact with the moist electrode pad or skin (screw terminals are preferred). Lead is dangerous. Gold plated is preferred for corrosion resistance, but it will still corrode. Aluminum foil rolled into a small ball around the end of the wire also works and is far cheaper. Wrap a tissue or paper towel around the ball and moisten with salt water.

A lower voltage version of this could be made into a CES device.

For a clock timer, this circuit has noticeable jitter.

Pressing down harder on the wrist electrode points seems to have a calming/relaxing effect in the chest.

Enhanced Dr. Bob Beck Biological Electrifier (Transistor Version)

Brief Notes.

This is an alternative to the LM358 version. Parts may be easier to find for it. Choose the fixed frequency or the variable frequency version depending on your needs. Take note of previous transfection warnings.

The transistor version can output voltages much higher than the LM358 version. This is not always desirable as a higher voltage can damage skin and cells. It can also cause electrolysis in the blood stream forming dangerous air bubbles. If the electrodes are placed across the chest, organs could be damaged.

While the transistor version can potentially operate without a voltage regulator from wall power if the parts ratings are high enough, at the very least, a floating regulator is still needed to filter out diode ripple. At 60Hz mains, there will be 120Hz ripple. At 50Hz mains, there will be 100Hz ripple. Both are significant and both are undesired for treatment.

The fixed frequency circuit cannot be modified to handle variable frequencies like many other schematics on Internet indicate. I tried a dozen variations and all failed. When increasing the resistance of RVRate, the square wave will elongate but will start tearing in the middle and convert to a “ball bouncing down” pattern on the oscilloscope. This probably has to do with transistor bases having a much lower input impedance than the LM358. A dual ganged potentiometer could be used in place of R2 and R3, but these have terrible accuracy and tracking and would produce a very unevenly spaced square wave. The quasi-darlington with regenerative feedback modification is the only method I've seen that can clean up the square wave. This became the variable frequency circuit. The square wave will still be a little bit rounded on the trailing edge, but it is still quite usable.

Since I rarely deviate from 30Hz on my treatments, I left in the fixed frequency circuit. An electrifier locked at 30Hz may be much safer in some environments and situations. The square waves are also a little bit cleaner than the variable frequency circuit.

If someone else has their own bipolar astable multivibrator that can output a clean square wave, it could be used in place of the circuits here. I specifically broke all the pieces out into modules for easy selection, description, learning, testing, and experimentation. This also holds true for the power supplies, colloidal silver generator, and LED flashers. There are literally endless combinations that could be done. The ones I've provided here are general enough to be sufficient for most people. These schematics should provide enough of a foundation for someone to search for other related schematics, if desired.