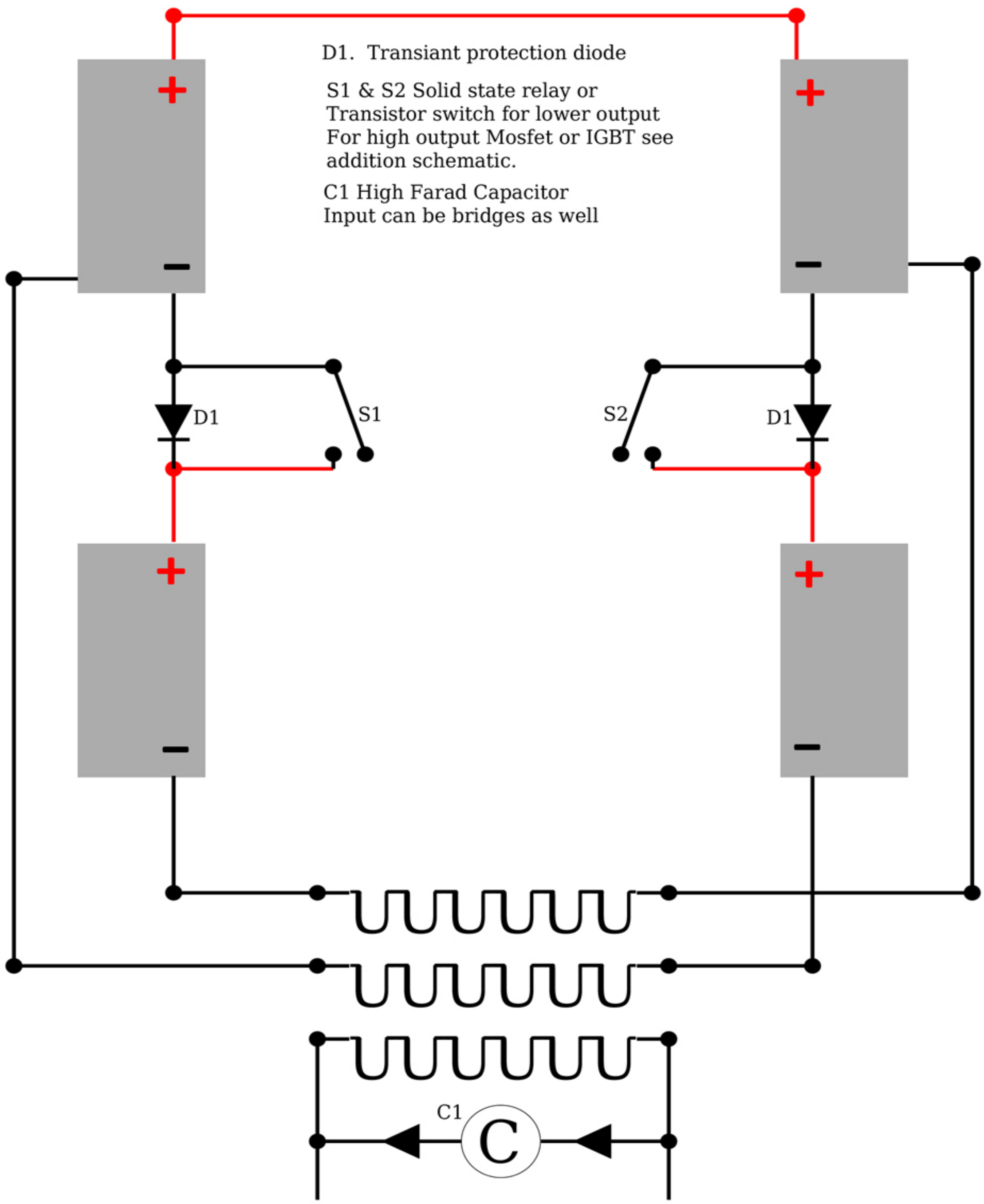
Simple Switch
A Tesla Switch Variation

Written by
Matthew Jones



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MJ

Foreword:

So why write all this down. Simple I get to many emails from people who cannot even fire a transistor who want me to personally teach them how to build a machine I still have not mastered. I no longer have time for that.
So now I can refer them to my publication, if I ever finish writing it. Best of luck to those who are in this predicament.

So I want to be as honest as I can at this point. Everything I know about a Tesla switch comes from lots of money, I myself, spent. A lot of hard work, lonely nights, missed trips and burnt semi conductors, and all the suffering I had to endure to learn about this thing. So if you think your going to get rich or your going to go and turn the lights on for the people for profit, YOUR FOOLING YOURSELF.

In no way am going to give you that much information. In fact I am only going to give you a very small portion of the foundation I have developed to achieve some of the numbers that I to get.

If you want those numbers for yourself. WORK HARD, SPEND MONEY LEARNING. Because if you don't your just shit to me. I care nothing for the people who are looking for an easy road out. You will not stand on my shoulders, you will only walk beside me.

That's the rant.......

But if you do what I say and display a good replica, I will share what I know. That's a promise.

What you are getting is a very easy, very powerful setup to produce power in the short term. Your batteries will not stay charged. But they will give you more power on the transformer end than is contained in your batteries provided the load is not in excess.

THAT IS IT....Period. All truth no BS but....

This system can be built on a large scale. If you build the 3kva version you will need very expensive parts and lots of batteries to make it put out the power your wanting. But I have an answer to lots of batteries. What I need to see are qualified replication before those facts can be shared.

To date I have built 26 versions of the TS. This was not because they did not work, it was an attempt to make them work better and learn. All of them including the mechanical showed very similar results except the one I am NOT writing about in this paper. Its results are hidden, and you will not be able to find them unless first you learn to produce AC power from a transformer through one of the available circuits.

The transformer . Why a Transformer. All these years we have seen the Six Switch version that ran load. Or the Muller replication that incorporated some transformers to Isolate the power to the transistors. But never once have we driven a transformer. Why?? That was my only question after reading the following article on Ronald Brandt.

RON BRANDT'S PERM-MAG MOTOR

by
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Ron Brandt began building motors and radios in the Third Grade. A few years later, he began making trips to the junk yards to collect all the cobalt magnets, coils, ball bearings, rotors, and steering columns from wrecked Model T's. His father called him "The Scavenger." This was back in the early 30's in Trout Lake, Washington, near the base of Mt. Adams. From these parts, he made even more sophisticated motors and many unusual electrical devices.

He joined the Navy at an early age and soon became an instructor in Math and Electronics. He taught students and co-mingled with Navy personnel who were involved with the Philadelphia Experiment. This experience really sparked his electronic curiosity. He spent 35 years working for the International Brotherhood of Electrical Workers, and on every new job site, he would bring along his 20' truck van with all his experimental motors, switching devices and controllers and work on them in the off hours.

With the advent of the gas wars of the early 70's, Ron built his first electric car, converting a '66 Dodge Dart to electric. The motor was a 24-volt, 32 HP starter generator off of a B52 bomber. He designed and built a 2-tank, 24-volt resonant circuit, each side, or tank, had 3 batteries. He drew sequential power off each tank with an oscillating resonant current using Navy surplus transistors and diodes. (See Diagram 1.) This circuit was presented to the International Tesla Conference in Colorado Springs by John Bedini, in 1984.

He drew positive power out of the negative posts of each side. By taking only 24 volts sequentially off the two a 36-volt battery tank by sequentially drawing power off each side, AC current was produced and hence converted back to DC with a Germanium rectifier. He stated, "If you can achieve resonance (about 900 Hz) with the controller and the metal alloy in the battery (which he did with his first set of batteries), it takes a long time to run the batteries down." He demonstrated this technology in the Dodge Dart at an Eastern Washington site by driving over 400 miles on a single charge. Some Allis Chalmers engineers observed the feat and said it was not possible, and that he was cheating. But

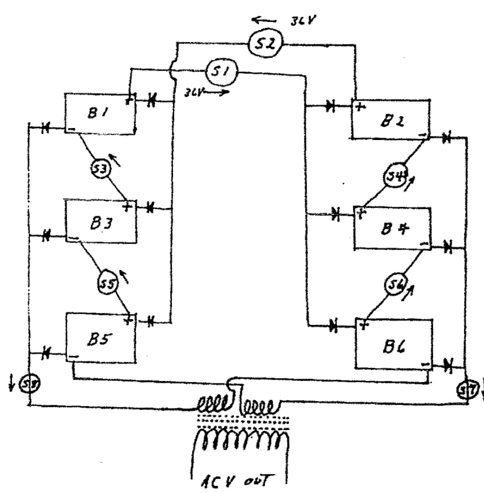


Figure 1. Brandt's 24-volt output resonant circuits.

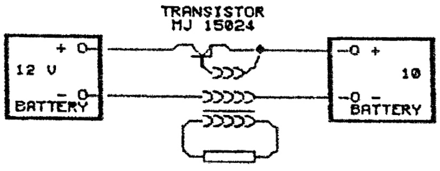


Figure 2. The Brandt-Tesla Switch Diagram BEFORE Resonance. To raise the voltage from 11.51 to 12.45V took 5 seconds. NOTE: 1-ohm resister remained cold after 15 minutes of runtime! **CREDIT: Experiments with Kromrey and Brandt-Tesla Converter**

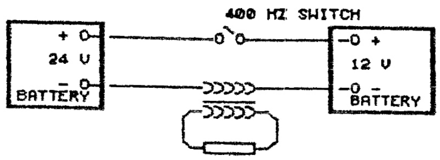


Figure 3. The Brandt-Tesla Switch AFTER Resonance is achieved. To raise the voltage from 1.7V to 10.24V took 1 minute 5 seconds. NOTE: 1-ohm resister remained cold after 15 minutes of runtime! **CREDIT: Experiments with Kromrey and Brandt-Tesla Converter**

Ron knew better. A few years later, he tried the same technology in his car, only different batteries, but was unable to achieve resonance and hence got only twice the expected distance out of his car, about 100 miles. He thinks the batteries made later were not uniform to achieve resonance.

In the 1980's, Ron started perfecting an advanced magnetic motor and controller from the experience he obtained in constructing an (Ecklin) Variable Reluctance Motor Generator from the ground up with the assistance of Dr. John Jacobs, using the theory from Ecklin's Patent #4,567,407. This particular motor achieved overunity of about 105%, but Ron wasn't satisfied and thought a more efficient motor could be built.

He learned that in a magnetic field, the strength of the field *and* how fast it collapses determines the amount of energy that can be recovered. The faster the magnetic field collapses, (back EMF) the more energy can be recovered for reuse.

In the Perm-Mag Motor, he isolated the rotor from the magnetic field for a more efficient collection of back EMF. The multi-stator ring is supported by six non-magnetic mounting studs attached to the aluminum housing back plate. The stator is selectively triggered by a peripheral coil activator to provide the proper magnetic phase relationship. With this unique design, there is no need for commutators or brushes which cause arching and sparking, common in most electric motor designs. The magnetic flux path is reduced by the low iron mass of the stator, allowing faster switching times, guaranteeing the highest efficiency.

The Power Commutator has 3 elements:

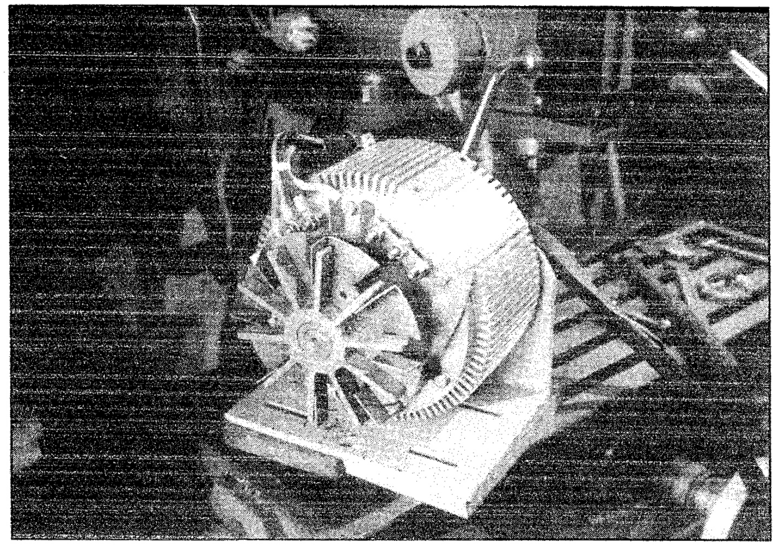
1. The magnetic band supports neo-magnets which transmit their rotational power to the commutator plate.
2. The commutator plate serves as a mounting surface for Perm-mag actuators for "Hall Effects" triggering as well as a mounting surface for an air cooling system.
3. The insulated shaft drive collar is made of non conductive plastic.

Most elements of the motor design are non-magnetic, which tends to shunt all the magnetic energy into the desired use of motion conversion. The exterior housing is made of materials of high magnetic resistance (high temperature aluminum or non-magnetic stainless steel).

The Perm-Mag motor is one of the most flexible electromotive devices developed, light in weight,

Ron Brandt and the main frame of his Ecklin Variable Reluctance Generator. **Credit: Bruce Meland**

10-HP Perm-Mag Motor Prototype. This miraculous machine only weighs 10lbs!
Credit: JW McGinnis



and small in size with wide ranges of power, speed, and direction which allows for easy construction, interchangeability, and repair.

In conclusion, the high efficiency of the Per-Mag motor exhibits one of the most efficient watt per horse power unit conversion ratings in the industry. The fact that Ron Brandt's Perm-Mag Motor does not create torque with electricity, but instead allows the motor magnets to create the torque by efficiently directing the magnetic flux makes the following features possible:

1. Complete variable speed control at rated horsepower.
2. Complete variable horsepower output at rated speed.
3. Complete variable braking capability from a dead stop to slow retardation.
4. Complete variable reversing from instantaneous to a slow, gradual direction change.
5. A wide range of input DC Voltages: from .5v (small designs) to application as high as 4160v.
6. Either manual or computer control.
7. Local or remote operation.
8. Can be used in high-risk environments where other types spark.
9. Has small physical size per unit horsepower.

More specific details of the Perm-Mag Motor will be forthcoming when the patents and market negotiations are completed. Ron will be at the upcoming ExtraOrdinary Science Conference '95 in July.__*BM*

Ron Brandt holding a six-pole rotor of an Ecklin variable reluctance motor-generator. There's a two-pole rotor in the box. Credit: Bruce Meland

There it was the whole time and most people have not even seen that article. Brandt of course plays it up to some oscillations that allow the battery to provide a resonates.
This is not the case. Although I myself thought so for a long time.

Brandt most likely did not even know what he was doing with it to make such power. His later attempts to recruit help on the matter shows he could not figure out why it wasn't working. The same people who tried to help, maintain today he didn't even build the car. Well I now know he did from several conversations I have had with witnesses. He is some what of an Urban legend.

The simple AC version (As I describe) no matter how balanced the batteries are will not produce an extended large power supply. Neither will the one outlined in the article.

Then we have heard all the other mumbo jumbo. And all the legends, and I myself won't say they are wrong but I doubt seriously if we sit around and wait on those sources to show us we will ever see anything more than a small bulb lit for along time. And I highly doubt the ability of the "Experts" do to recent events. They tend to show more hype than fact.

A large system will NEVER be shown and most likely the "Experts" can't even imagine how to build anything on a household or vehicle scale. And if they did the price tag would ruin the experience of owning it.

The TS is not a matter of the reaction from the batteries or the transformer. It is not the SWITCHING that makes it happen.
Its the reaction you create in the environment you build and the power that reaction returns. That power is then stored and released, in an unimaginable way.

Of course that's another lesson. The best you can do is put away the nonsense you have been taught or told. It means nothing because the truth is not out there. You have been told to many stories for it to come back and present itself.

Most of what I have always believed about the TS has been wiped away with this SIMPLE LITTLE SWITCH. So now you have to get started with it, learn how to use it in the form I am giving you, report your data and your work, whether good or bad, then I can show you how to get the power out of it. If you choose to change things or plague me with doubt about functionality don't expect to see anything further than the rather unremarkable little power supply outline in the publication. But do good work study and get my attention and I promise you, you'll see good things.

Lets get on with it.

Matthew Jones

The shopping list:

I posted this some time ago before the publication came out. This list will simply outline some of the major parts you'll need to either make the small or large switch.
I do not include resistors and switch's. This is on purpose. You must pick the schematic you choose to build. Only you know what you can build but you can use Solid State Relays, transistors, mosfets and IGBT's, and even radio quility high current mechanical relays, if you can afford them. That's up to you. They all work. But if you feel you need to stray from the plans, make sure you understand things do not always work as expected. Your results may differ.
Everyone of you should understand the batteries make difference. A 10 amp hour battery will not run as well as a 100 amp hour. A deep cycle acts different from a car battery. So choose your batteries and stick with them. If your going to build small go ahead and gt small batteries. If you going to get big I would suggest using a battery with CCA rating. Cold Cranking Amps. You only going to draw 1 large load from the batteries on start up after that the power gets shuttled around and the draw from the lead plates is just supplement at that point.

Little One

●4- batteries of equal size 5-20 amp hour.

●Simple B2 Stamp kit
Stamp Stack II Kit
Stamp Learning Kit
KIT BASIC STAMP 2 OEM MODULE - 27291

You can use a PIC or Arduino or any IC other than the stamp that will turn a PIN on and OFF, BUT you better know how to write the code and how to calculate TIME for the pulses.
Sorry...Stamp is easy and Simple, that is why I am recommending it.

●1- IRON based Standard Transformer.
25.2V CT 2.0A Heavy-Duty Chassis-Mount Transformer

This same transformer or ones like it can be found at Digi-Key. Or...You can salvage one out of an appliance as long as its the same size or bigger and iron plated. 2" wide, 2" tall, 1"+ inch's thick.

●200 ft or so of 20 AWG magnetic wire.

●2- 10-20 amp switch's. ****See schematic details on switch's after list

●40 amp bridge rectifier, OR 4 diodes to build one

Digi-Key - FFPF15UP20STTU-ND (Manufacturer - FFPF15UP20STTU) ***Best Option
Or you can hit your local supplier and buy something of your choice

●Capacitor, 5 of the following

Digi-Key - 565-2677-ND (Manufacturer - ESMH500VSN103MR45T)
You can find something close on EBAY. What you need is 50,000 uf at or about 25 volt or more.
You can buy multiples or singles that are in that range.
This is not a key component it is simply there to provide a short term storage for you load.
12-14 volt .5 to 1 amp load, preferably an automotive incandescent bulb.

BIG ONE

If you are going to build this one you had better be able to follow basic schematic and you had better have GOOD organization skills so that you keep track of what you are doing and what wires are what. ONE WRONG connection can cause a serious damage to the system and operator. I do not take any responsibility for such mistakes. Safety should be your first priority. When in doubt do NOT do anything and ask.

- **4 Batteries 100 amp hour or better**

- **A Stamp module, Or IC controller, see above list**

- **Transformer. 1 -3 KVA or 1000 to 3000 watts. BIGGER IS BETTER.**
  3000 Watts Step Down Voltage Converter

- **#6 AWG Square magnetic wire at 150 ft, OR #14 awg magnetic wire at 300 ft.**

Now you can use anything in between the 2 listed types of wire. But do not go smaller than 14 awg, and DO NOT THINK you can wrap 5 strand of 20 awg together to come up with that size. This a recipe for HEAT and does not work well. You cannot use insulated wire either, this is also a recipe for poor inductance.

- **40 - 100+ amp switch's BIGGER IS BETTER.**
  ******See schematic details on switch's after list**

- **200 amp Bridge rectifier.**

Digi-Key - FFPF15UP20STTU-ND (Manufacturer - FFPF15UP20STTU) ***Best Option you will need 50 of these and some Copper or PCB board.
Or you can spend big money and buy built Bridges. The above diode setup that recommend building is CHEAP and FAST with a low power loss. This is important when you start driving loads.

- **1-3 farad worth of capacitors. Your choice. Quality capacitors should be used.**

A 12 volt 100 watt load for tuning. Halogen light bulbs for automotive or home use are the best.

Now if you just jumped to the big one and you cannot figure out the above list, You do not have the needed experience to build this level of switch so don't. Build the small one. If you have built the small one and can prove it get me at Energetic forums and I'll be happy to answer the questions you have.

The Transformer:

**No big trick here. The first thing you have to do is get the body stripped out.
I always use a razor knife. To separate the plates. They usually are stuck together with lacquer.
The first plate doesn't come out nice. Use a flat tip and beat it out if you have to.
The biggest thing you need to be careful of is the plastic spool in the center. No matter the size of the transformer that spool is brittle, it will break and make the job of putting it back together all the harder.
So you'll get the picture. It comes apart just like it goes back together.**

Winding it up is not big trick either. In fact there is no trick. You just need to keep track of your wires.

If your building the little one your going to need #18-#20 awg wire. If you building the big one you want wire between #6 square AWG up to #14 awg normal round wire.

We'll go over winding the small one first.

Since we all might be using a slightly different body of transformer, and I have yet to find a solid formula for knowing how many strands will fit on a spool of any kind, we'll do it the rough way.

Maybe you have a reliable formula...you if it works.

So lay out 3 strands of wire all equal make sure they are long enough to cover the spool plus some extra. We are using 20 awg and if the body is similar to the one I suggested it will not hold more than 3 strands at 50' but I'll leave to you to guess closer.

**Before you wind them up mark each one with some tape to mark the start of each wire, this will be important to know.
Wind up all 3 strands equally . Count your turns while doing this. Fill the spool.**

Remember the 3rd wire is 25% percent longer. So we need to unwind and you have 3 strands. You should know the footage on the strand by what you have left over.

IE.. You laid out 50 ft. Now that the spool is wound you have 30 ft left over. You know you have 20 ft on the spool.

So 25% of the total length is 5 ft. You have 3 strand so pull off 1.5 ft off the spool. Take 2 wires and cut them. Make sure you leave yourself some extra wire for leads and mark them as the finish of those 2 wire. Then finish filling the spool with the third wire.

Kinda rough and complicated I guess but it makes sure you have 1 wire that is about 25 percent longer.

The most important thing is to keep track of the wires start and finish.

Now you have the spool wound up make sure it is contained within the edges of the spool. If needed make a jig with wood or something to compress the wires on the side of the spool with a vice or pliers or what ever you have to do. The side are all have to worry about.

When your done get a wrap of tape of some kind preferably something that can take a little heat in case you an accident when wiring.
This is important when you start to install the plate. You do not want the wire to get scored from the iron plates. The insulation will be compromised and you will get a short in your windings. No matter how you describe it it will be BAD.

So now reinstall your plates. You most likely will not get all of them back in but try. You might have a way to compress them further so they all fit back. I usually end up with one or so left over.

Secure the housing so the plates do not vibrate. Its not important you just want a limited amount of noise if at all possible .

Make sure if you do anything the leads of the transformer you keep them clearly marked. Which one is the start and which one is the finish of the Primaries and which one is the Secondary output.

At this point I always like to lay the thing out. Screw it down to board. I do not do neat and pretty I just try to make it functional and easy to keep track of.

You do what you want but for the sake of instruction lay this thing out and ,mark it as follows.
So here is how I am labeling things. If you follow that then you'll be able to follow the discussion

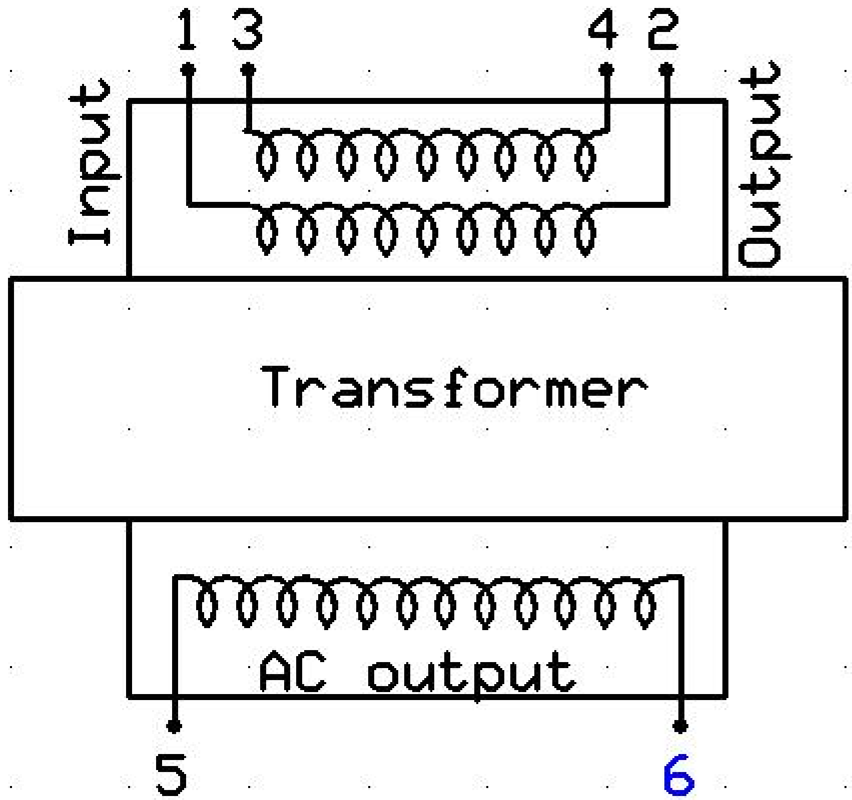


Fig.1

Now your transformer is ready.

IC.

Lately I have been encouraged to provide documentation and instruction on all the IC's. And I can but I may have a mistake as I do not use all of them. Usually for prototyping I use the Stamp2E.
Its easy to use. The documentation is clear and the setup is simple. If you do not have one and access to one is out of reach you can use. A PicAxe, an Audriono, an Ubicom SX, AVR or anything else that fits the bill.
The code is simple and you can find it in the most basic tutorials. We just need to turn a pin on and off for simple amount of time. The amount of time matters. We need to operate within a microsecond. IE .000001 seconds. We actually need 2 pins.

So I will go the Code later but I wanted to mention the fact that you are not tied directly to one IC of my choosing. You will just have to figure out how to turn the pin on and off if I have not included instruction for that IC.

You will also need to figure out how the IC setup works. Most have PINS for an output signal and a ground pin. Those are all you will need.

So get your favorite IC and read up on the basic blinking light tutorial.

Switch's

We've got to have switch's. They are the key to the performance in this particular schematic. But they are not any more important than anything else. The most important thing is YOU KNOW how to use it.

SSR's

You can use a SSR (Solid State Relay). These are easy and they taken me along way in my research Most have 2 sides the POWER side and the CONTROL side. The power side has a positive and a negative hookup. The control side also. You will need to refer to the data sheet to understand exactly where they are.

On the following page is a basic outline of how the SSR should used to make serial connection.

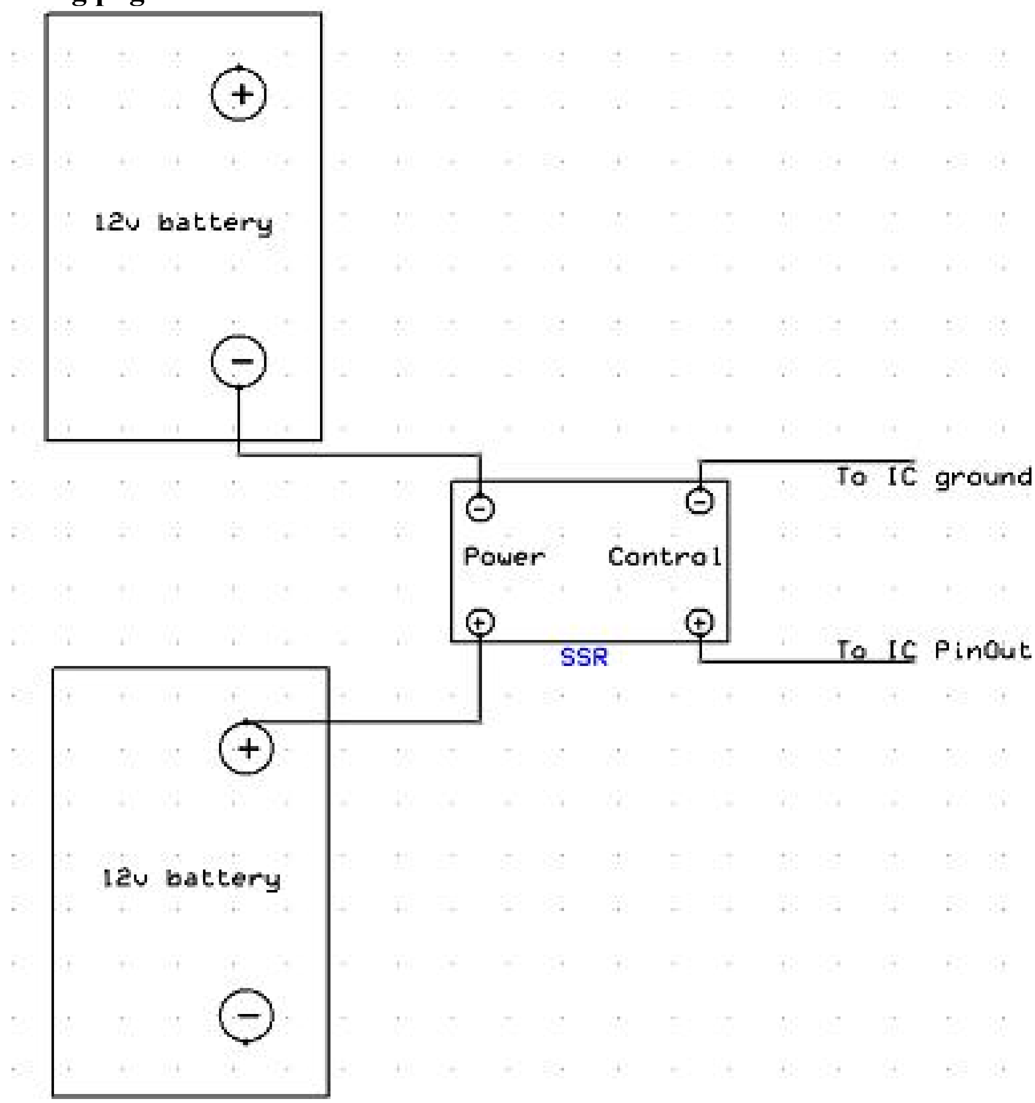


Fig.2

Transistors

These were the hardest for me to get when I started. At one time I though it was too huge of a trick to even think about in a for real application. But it turned out there are a few rules and when those are followed its really easy. So if you haven't used transistors before I should be able to convince you and show you how easy it is.

We are going to talk about the MJL21194 But any transistor can do the job as long the specs on it are as follows. 200V DC at 20 amp or better. That's it.

So maybe you have maybe you haven't used a transistor but let me some it up. Its a switch, you run it on and off by feeding it a small charge or signal. Just like the SSR.
You have 3 pins Base, Collector, and Emitter. If we use it in the serial position of our switch, we need the positive hooked to the collector and the negative hooked to the emitter.

The base of the transistor is then driven by a signal that is either sourced from the same side of the power as the collector or from an external source that is grounded common with the emitter.

Lets look at a small example..

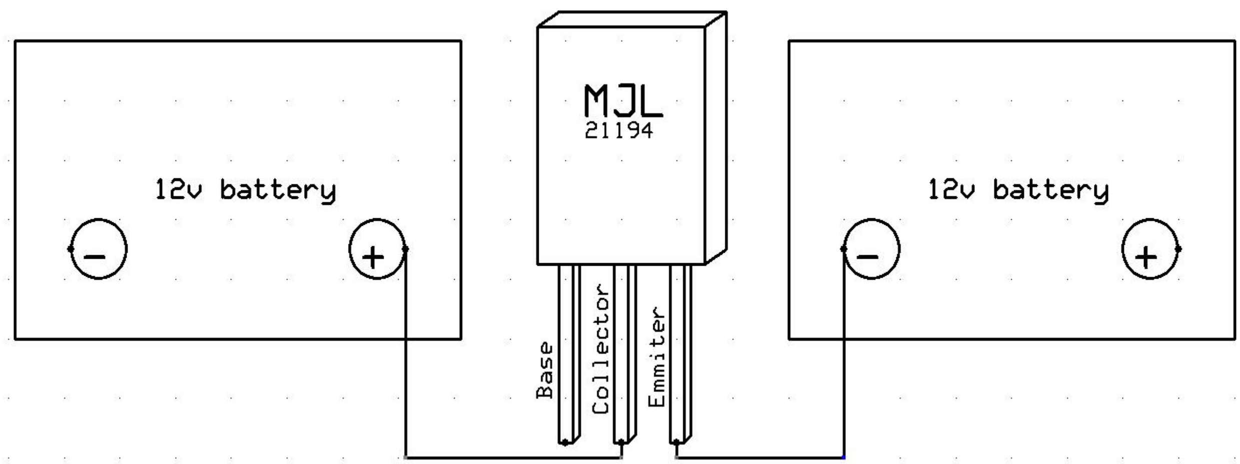


Fig. 3A

I am showing you 2 batteries with a transistor in the serial position. Not ready to run.

We now have to turn the base on but we cannot do this like we did the SSR in Fig 2, with a separate power source. We have to make sure the voltage used to turn on the transistor is common to the Either the collector or emitter. So if we use a separate power source we need to common the grounds

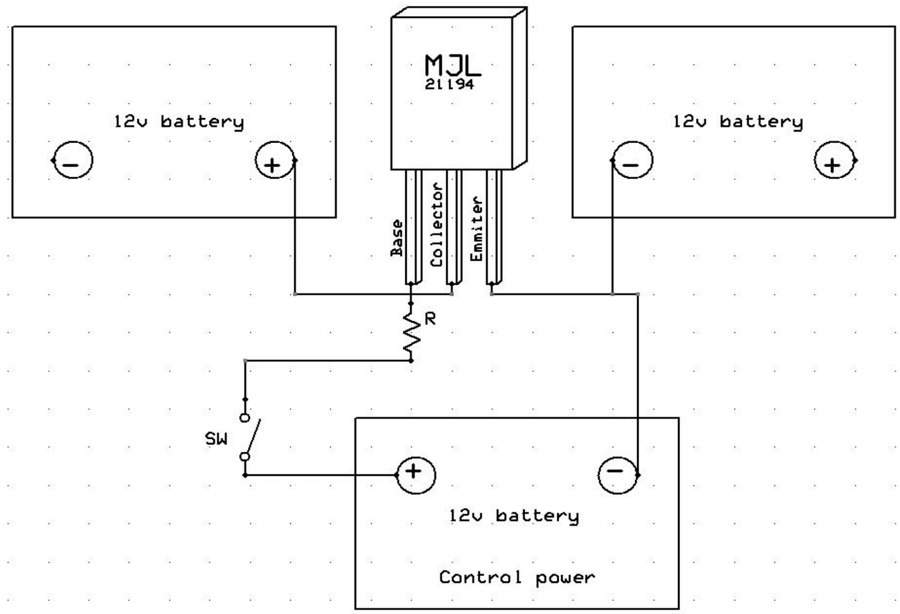


Fig.3B

So why do we have to common ground it. I do not have a technical answer but basically the transistor BASE ground through the emitter so the power has to be able to loop back to the ground side of its source. Or it won't be able to travel through the transistor and turn it on. Hopefully you can see why we need the ground to be common.
You should also notice the squiggly line hooked to the base with and R next to it. That's a resistor as far as the schematic of things are concerned

In Either case we do not need to do this at all. We can just get our power from the positive side of the connection.

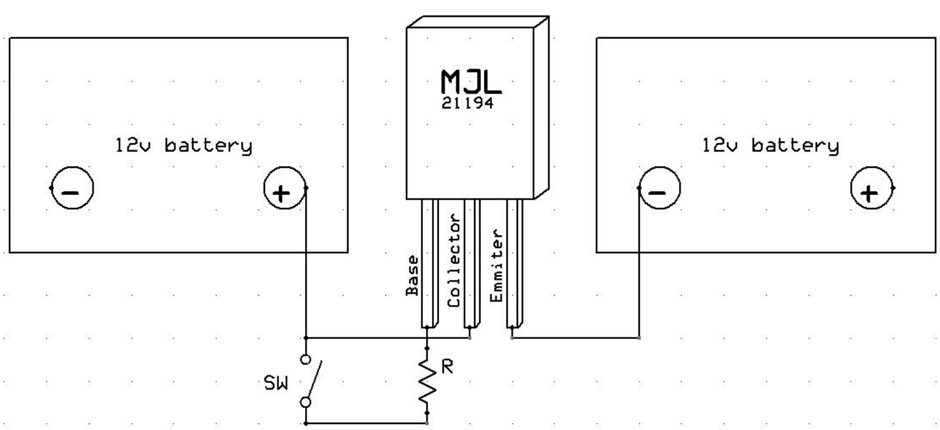


Fig.3C

Now everything is as it should be. We are on a common ground with source of power to turn on the transistor. All we have to do now is turn the switch (SW) on and the transistor turns on.

.
Now I want you to get your test lead out and multimeter and do a little experiment for me. This little test is to prove we are turning the transistor on.

I want you to make a setup as follows.

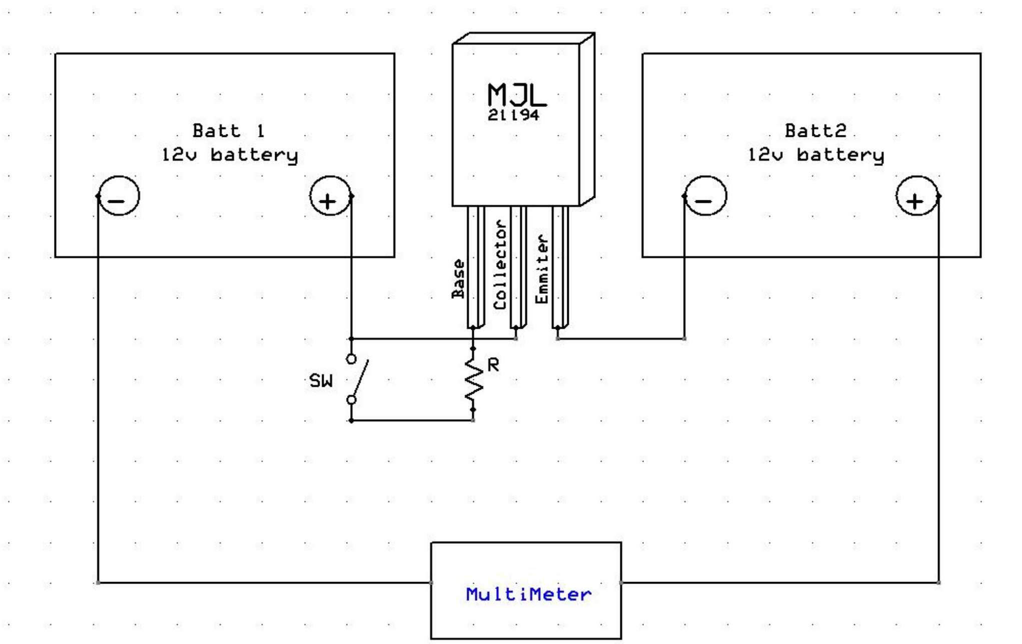


Fig 4

Now if you don't have a switch handy you can just hook one end of the test lead to the Base of the transistor and the other end of the test lead to the resistor. HOLD the resistor and touch the positive pole of Battery 1 (Batt 1).

Watch the meter. If your using 2, 12 volt batteries your going to see somewhere around 24 volt. Maybe less. Either way write down the voltage you have measured. If your not seeing 24 volt or so check all your connections.

Now measure each battery and add the voltages together. Now look at the voltage you measured from the serial connection and look at the voltages you measured from adding the 2 batteries up.

Quite a bit different HUH?

This is a basic voltage drop caused from the transistor. I just wanted you to see this so later you will understand what I am talking about when I say "Voltage Drop". The voltage drop is caused from the resistance in the transistor.

So now you should have the basics on the transistor and why and how it can be used. Later we will discuss in the construction of the circuit why we would use different configurations of transistors.

IC Component

We are going to talk about the basics of several IC kits. I have not used them all but I have reviewed the documentation of both the compiler and the code to right, but I may not be totally right.
The code used in this version of the switch is very simple and most people should be able to get the IC of there choice and find a simple tutorial for it. Most IC's come with a simple tutorial called "Blinking Light". This tutorial and the code that come with it is enough to run this version of the switch.
Then next thing you will want to know about your IC is the time value. Some IC's run on a clock and have a hertz rating and the code needed will be based on that. Or some use actual time, or units of time.
An example is the BS2 (Which is in the schematic). It runs on a custom unit if you use a command called Pulsout the unit of time used is 2 microseconds.
IE
pulsout 1, 100
This command means make a pulse from pin 1, 200 microseconds long. The BS2 uses 2 microseconds per unit in pulse out command.

So I hope your following me. So lets get on to the IC specifics.

We will first go over the Basic Stamp 2e. This is what I recommend because it is very easy to use but you know your own situation and you may already have another.

BS2

The first you need the compiler if you already do not have one.
PBasic Compiler

You'll need to tell the compiler what kind of code and what unit you are using look in the top bar and click these buttons.


Once you do this the software will enter some code in the header section. This is to help the compiler know what it has to do.

Now all were going to do is create a "DO LOOP"

Do
Pulsout 1, 1250
Pulsout 2, 1250
Loop

This says "*Do* the following Commands"
"*Pulsout* pin #*1* for *1250* units or 2500 microseconds"
"*Pulsout* pin #*2* for *1250* units or 2500 microseconds"
"Loop back to the beginning"

That's it. Its as simple as pie. Remember we have more things cover before you fire up your TS so just hold your horses before we get going.

PIC

Now Pics are a little more complicated of a subject. They come a lot of flavors. The primary difference is the BIT count. They come in 8,16,and 32 bit. This only matters when your going to get into higher math and more complex functions. If your already capable of using this stuff you don't need this section.

If you just getting started though know this... The code for all of them will be the same. The functions we are using is are the very basic of this IC controller. The IDE you want as far I can tell is AxePad. There might be others but this one will cover what we are doing.

The biggest thing I can find about the PIC is the time equated to the "Pulse Out" command. The pic uses a unit that is worth 10 microseconds. So the time on the command will be reduced to a count of 250. That would be (250 units) x (10 microseconds) = 2500 microsenconds.

Your code is just like the Stamp other than the time.

Do
Pulsout 1, 250
Pulsout 2, 250
Loop.

Hit Program and your running. Remember we have more things cover before you fire up your TS so just hold your horses before we get going.

**I am not going to include any other IC's in this discussion. It was my original intention to cover 5 of them that are commonly used. But the documentation on most them is too large. Some of them even make you take an oath that you will not distribute the code outside of the US.
So I am not going to go through all that.**

If you choose another IC you need to make it work. Period.

Schematics

So at this point I need to go ahead and put TS schematics out for you to look at and for us to discuss.

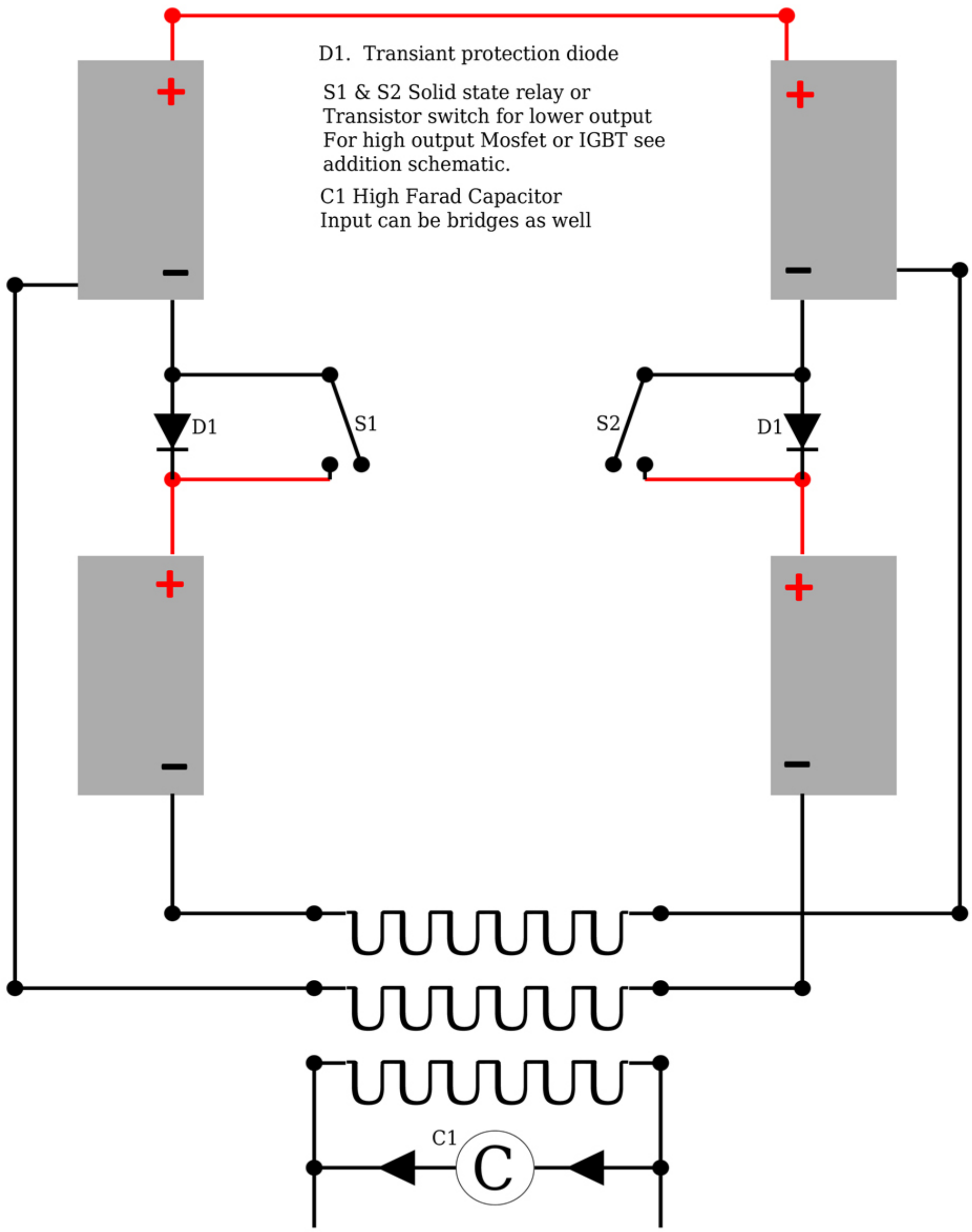
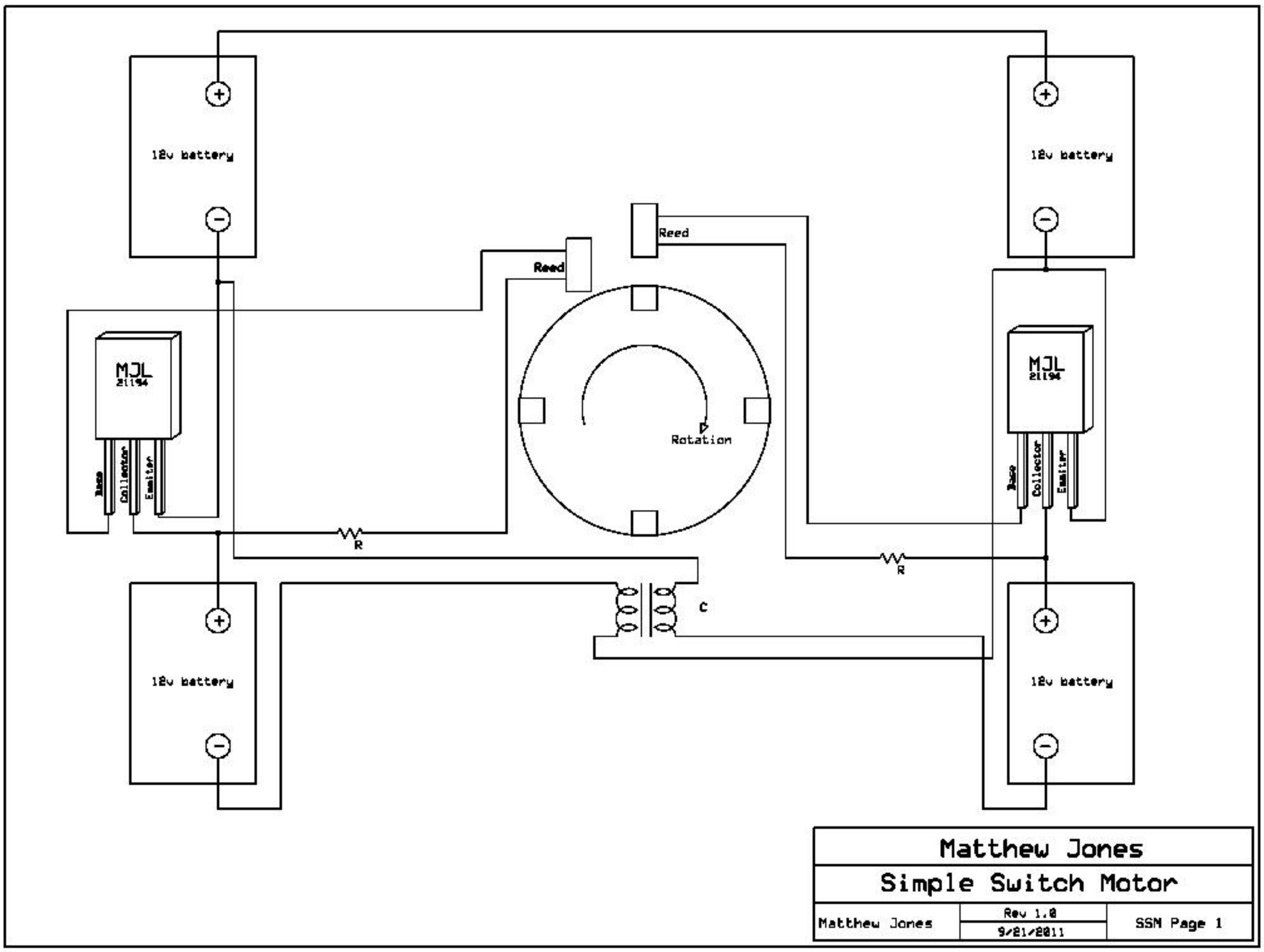


Fig 5.

This was the original schematic that I put out for everyone to replicate. It was my thought at the time that this thing is so easy to understand anyone could give it a try even if they did not know anything about the TS.

How hard would be. You could go get some parts and explore the possibilities. After all that's all I did. My first version of it was a small coil with 2 windings. A wheel with 6 magnets evenly spaced around the wheel. 2 transistors for serial switch's. And 2 reed switch's.

If you gave the wheel a spin the transistors would turn on based on the position of the magnet to the reed switch and the coil would either pull the magnet on the wheel in or push it away based on the direction of the currents travel.



Some of you might want to play with this. It can run 6.5 months on 4, 4.5 amp hour 12 volt batteries. Enough said.

So if it worked that good in a little crappy motor and what would large transformer do? And the whole time it was right there in the article about Ronald Brandt.

I had to give it to everyone. So I posted it. And to my amazement the so called researchers wanted details. Specifics. Only 2 people just went and got whatever parts they had laying around and tried it. NO ONE ELSE!!!!!!

So I must just be unique in the fact that I could care less if it burns up or give results I just want

to see if it works. While everyone else must copy. HMMM??

Whats with that BS??? And people ask "Why aren't these things on the market?" Makes you wonder about the spinal fortitude of the FE communities members. Yes that means YOU. I have no need to flatter you. I have need for you at all. I am only writing this paper for the ones who want to get started not for the one who claim to know. You know nothing because if you did you would not need this, you would build and see what happens, and build again to make it better.

So anyway lets get past the rant and history and talk about how the thing works. Before I get pissed and write a bunch of crap about you BIG THINKERS.

Again I must say Its simple. So simple..

The TS takes 2 batteries puts them in series creating 24 volt. On the other side you do not have a ground you have the positive (Or negative) side of another 12 volt battery. The 24 volt flows out as current push's through the load. In our case the load is a transformer. The current shares it magnetic flux with the Iron of the transformer and the output wire takes its share and turns it back into current and out come some power for us to use at little to no cost. Then we switch the direction. So the same blast of current we put out the first time goes into the opposite direction and does a little work again, and again, and again... Until finally it either diminishes from entropy or deposits itself in the plate of the parallel battery.

OK all the researchers say HUH? And scratch there head together at the same time....

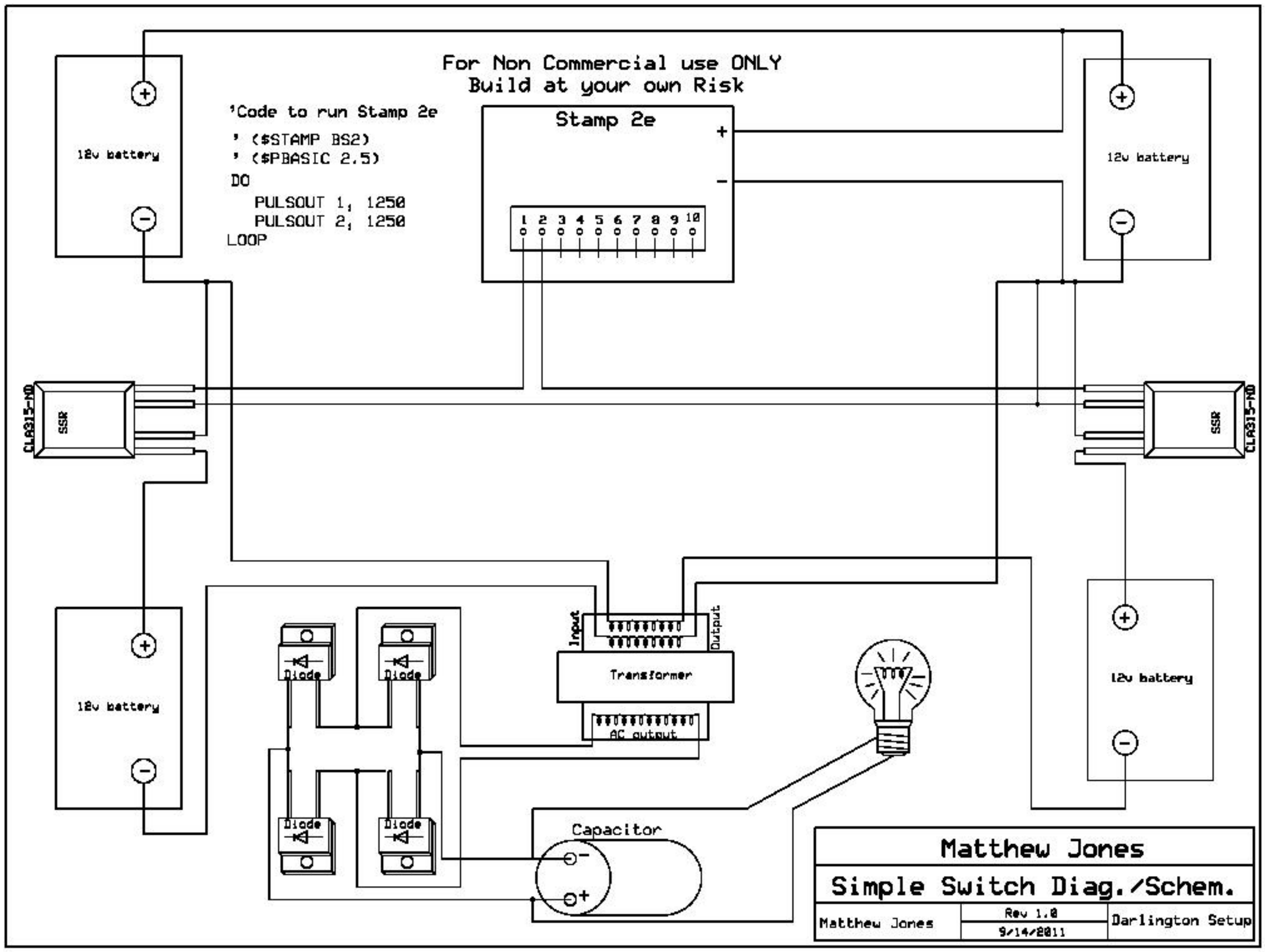


Fig 6

We'll start with the relay based version. If you have never built any TS setup before this may be your best bet.
This would have been the first version I built with the Transformer. Why? Well because I always take the easiest route to my goal. It makes it simple after all and that is what I am about. Or at least I like to think so.

Lets talk about this circuit and the flow of potential it creates.

You should already be familiar with the SSR at the serial switch position and how it works. We are driving it with the IC and you should understand your IC by now.
So the IC sends runs a command to make pulse. This pulse of current runs out of the IC into the ON side of the relay. The relay turns on on the LEFT side putting the 2 batteries in serial position creating a 24 volt potential. We already know the other bank is in parallel and standing at 12 volt. Between the 24 volt potential and the 12 volt potential we have 12 volts of potential left over.
The current from this 12 volt of potential travels through the transformer and creates a magnetic field in the transformer. This field travels from out the top of the inner core around the sides into the south side of the the transformers coil. When it does this we induce a potential with current on the output wire.

If you were to look at it on a scope you would see the following.

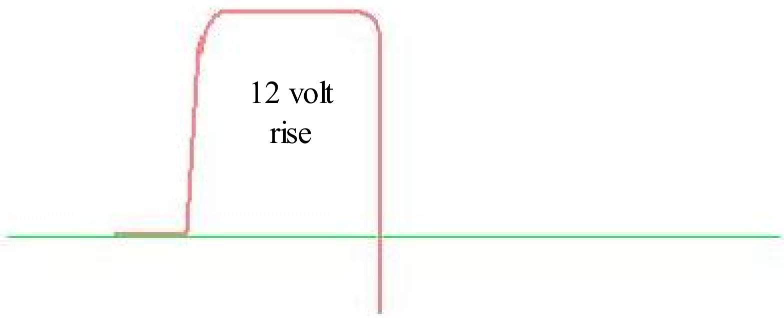


Fig. 6A

This shape shown in a scope shot is caused from the magnetic field going through the transformer in one direction.
When the opposite side turns on you will see the following image.

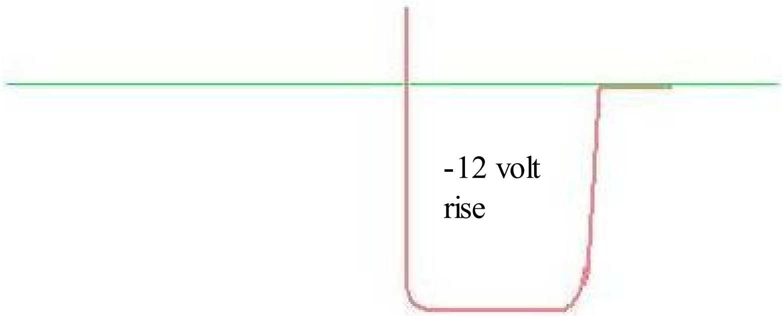


Fig. 6B

This is still because of the direction. We pulling our load from the ground side of the battery but based on its position in the transformer we see different waves.
The combination of the 2 waves going back and forth causes an Alternating Current (AC) pattern.

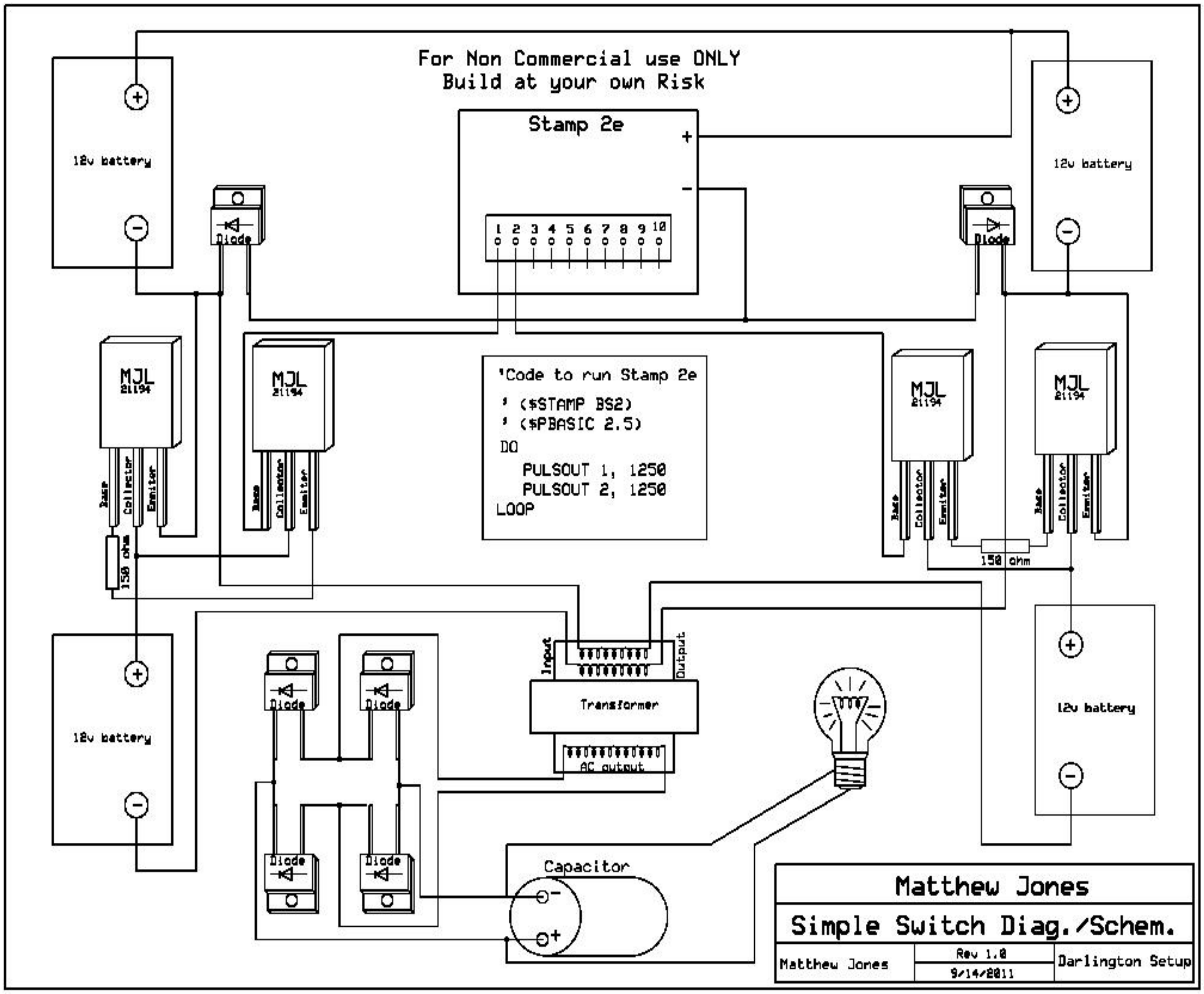
If you look at the output wire from the transformer you'll see we have Bridge rectifier hooked to it. This is because we need DC for the load and the capacitor. The bridge reorders the waveforms above so that can use it as DC.

The entire process very simple as far as circuits go.

I did not go into a lot depth but the more you look at you should be able to start to understand why it works.

I will include 2 more schematic after this encase you choose to use another instead of the relay based version.

DO NOT start any of these circuits until read the section entitled "Start Up and Saftey"



For Non Commercial use ONLY
Build at your own Risk
Stamp 2e
12v battery
12v battery
12v battery
12v battery
Diode
MJL 21194
Base
Collector
Emmiter
150 ohm
'Code to run Stamp 2e
' {$STAMP BS2}
' {$PBASIC 2.5}
DO
PULSOUT 1, 1250
PULSOUT 2, 1250
LOOP
Input
Output
Transformer
AC output
Capacitor
Matthew Jones
Simple Switch Diag./Schem.
Matthew Jones
Rev 1.0
9/14/2011
Darlington Setup

Fig. 7

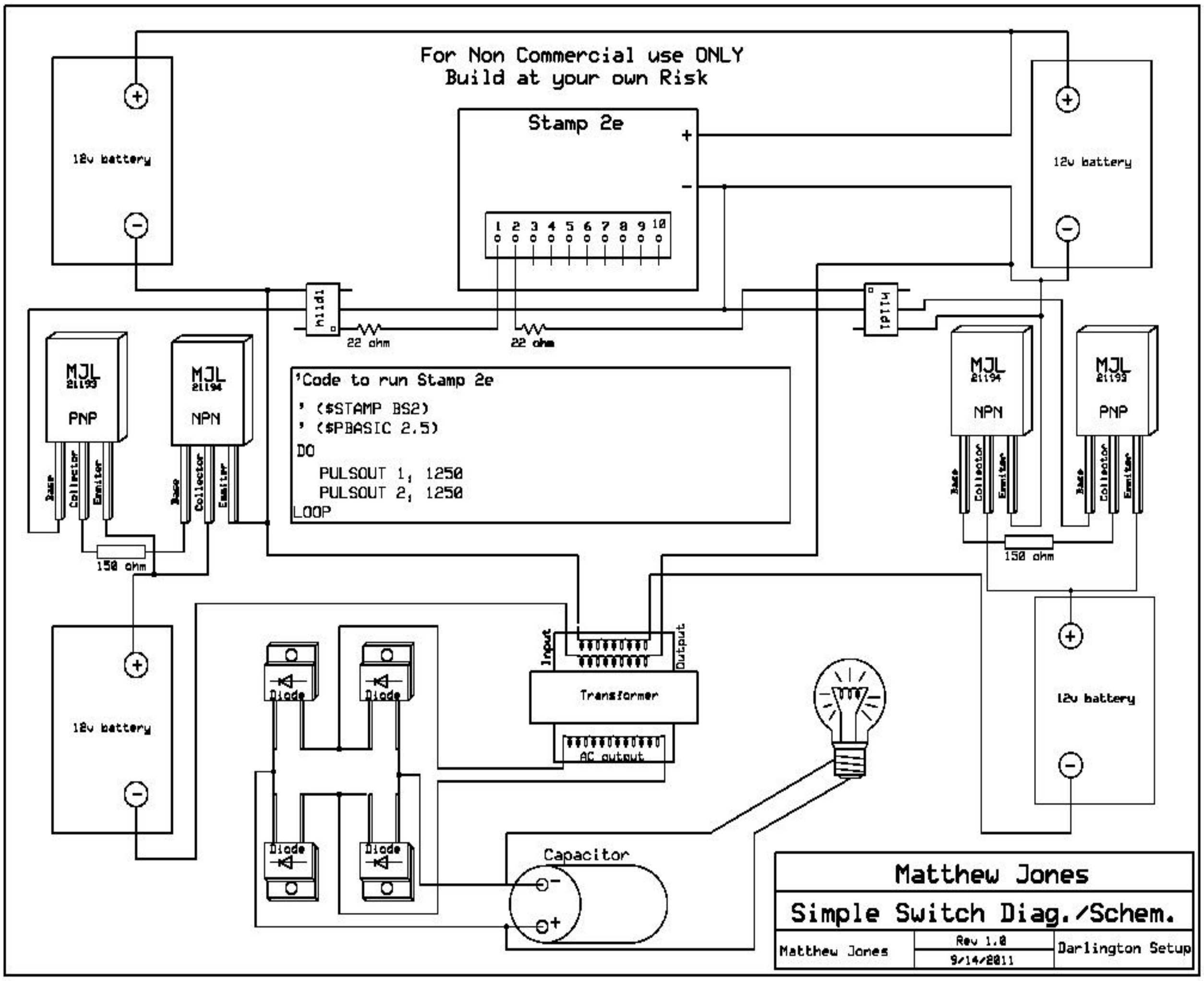


Fig.7a

Start Up and Safety Checklist

I wanted to make sure everyone read this section thoroughly. It is very important to me that everybody is safe and prepared to be able to make sure the switch is going to run prior to starting it up.

The check list is easy to follow and if you follow it you know without doubt that the TS your building will run without a hitch. So now your all wired up, you gotten familiar with your IC. You have a setup ready to run. Or so you think...

Look at the following schematic.

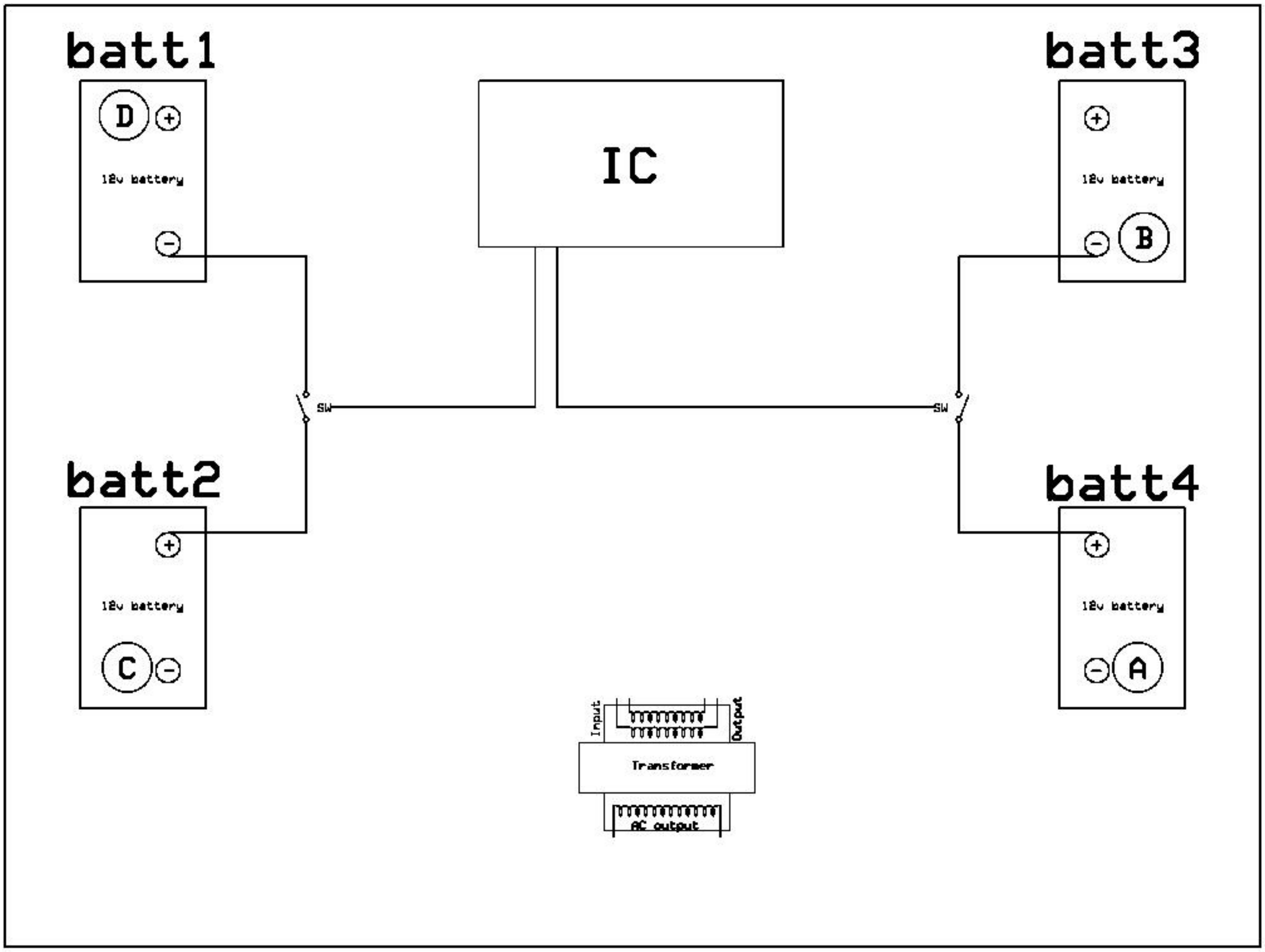


Fig. 8

Your going to notice at this point that the transformer is not hooked up. This is what you should do at this point. UNHOOK the transformer. Hopefully you haven't soldered it or something permanent.

Now your gonna need your meters. The first thing we are going to check is the switching.

Are we able to serialize our batteries?

Hook a meter on one side to point A and B on the battery. Then if you have an extra meter hook it to point C and D.
We are going to go ahead and write some test code..

BS2
Do
high 1 'Turn pin 1 on
pause 2000 ' hold pin one on for 2 seconds
low 1 'Turns pin 1 off
pause 100
high 2
pause 2000
low 2
pause 100
loop

What this will do is show 24 volt or so every time the IC turns on the switch. It should go back and forth. Since it turns on for 2 seconds you should have plenty of time to see whether it is working or not. If the 24 volt stays on you have a bad switch or a short circuit in your switch that is not letting the switch turn off. Replace the switch and if needed replace the driving circuit.

But if everything checks out your serial switching is working and you can go on to the next step.

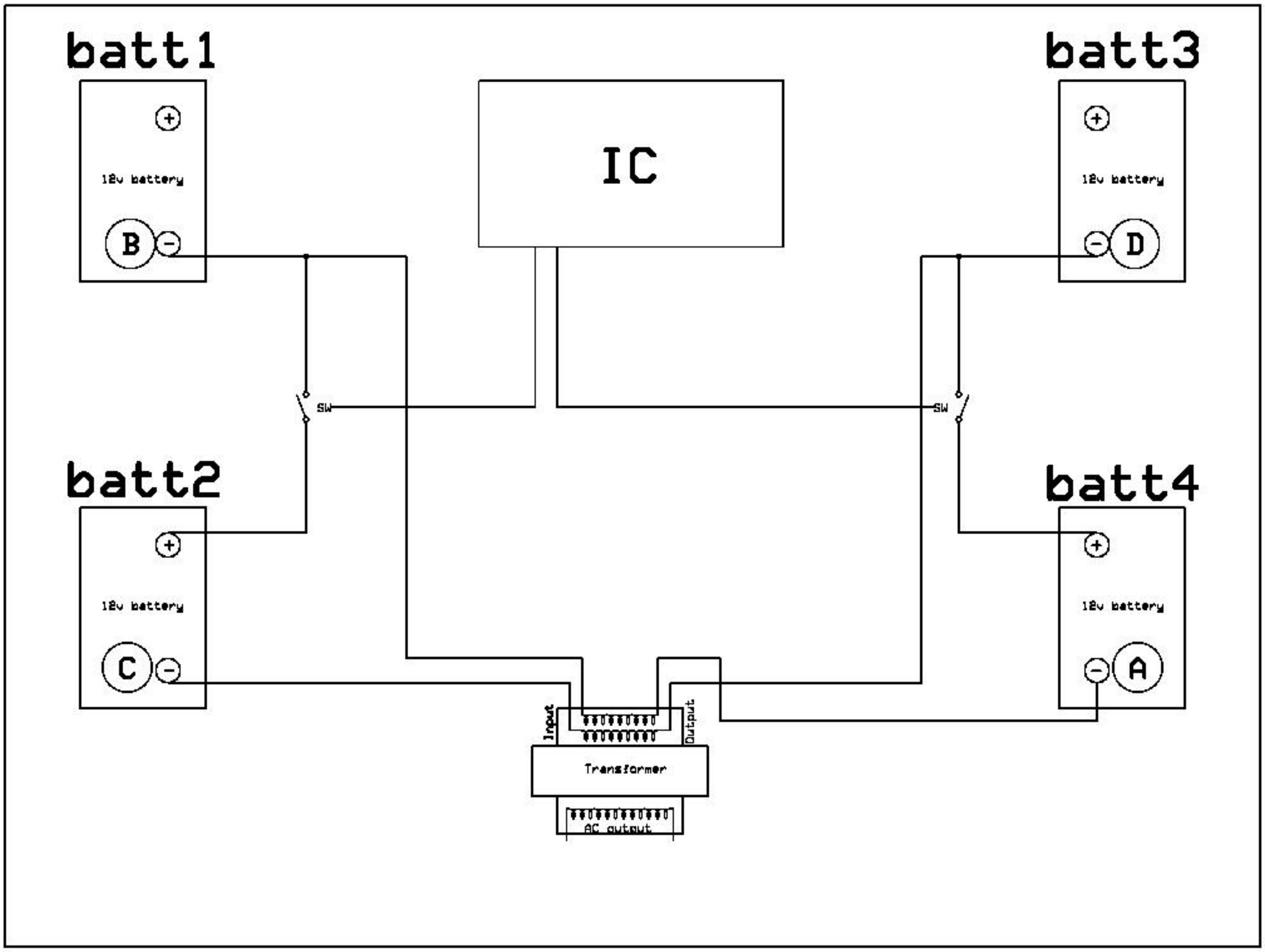


Fig. 8a

At this point we have the transformer hooked up. Hopefully you hooked up correctly, but for good measure we are going to check and have no doubt it is hooked up correctly.
If it hooked up incorrectly your switches will burn. So make sure you do this test.

Your going to to hook the continuity meter (makes a beep when you have a connection) up between the ground side of Batt 4 Ground (Point A) and the Ground side of Batt 1(point B)

You should get a beep. This means it is hooked up.

Now we will do the other side. Check from the ground of Batt2 (Point C) to the ground of Batt 3 (Point D)
You should get beep. If you didn't check your wiring.

Now here is another big test....

Check your connection between the ground of Batt 2 (Point C) and the ground of Batt 4 (Point A).
Check Both those sides to your Output wire. AND check all the connection to the Metal plates of the transformer.

Did it Beep at all? Bad new if it did you need to rewind your transformer cause you cut a wire. And if you cut a wire then you did not follow my instructions and tape the transformer winding or you were careless when you put it back together.

But if everything checked out your good to go so far.

One more really critical thing to check.

I told you the most important thing you can do when winding that transformer is to mark the beginning and end of each wire. So we are going to confirm you wired it correctly through the transformer.
Your going to have to check the following visually and hopefully you marked wires correctly.

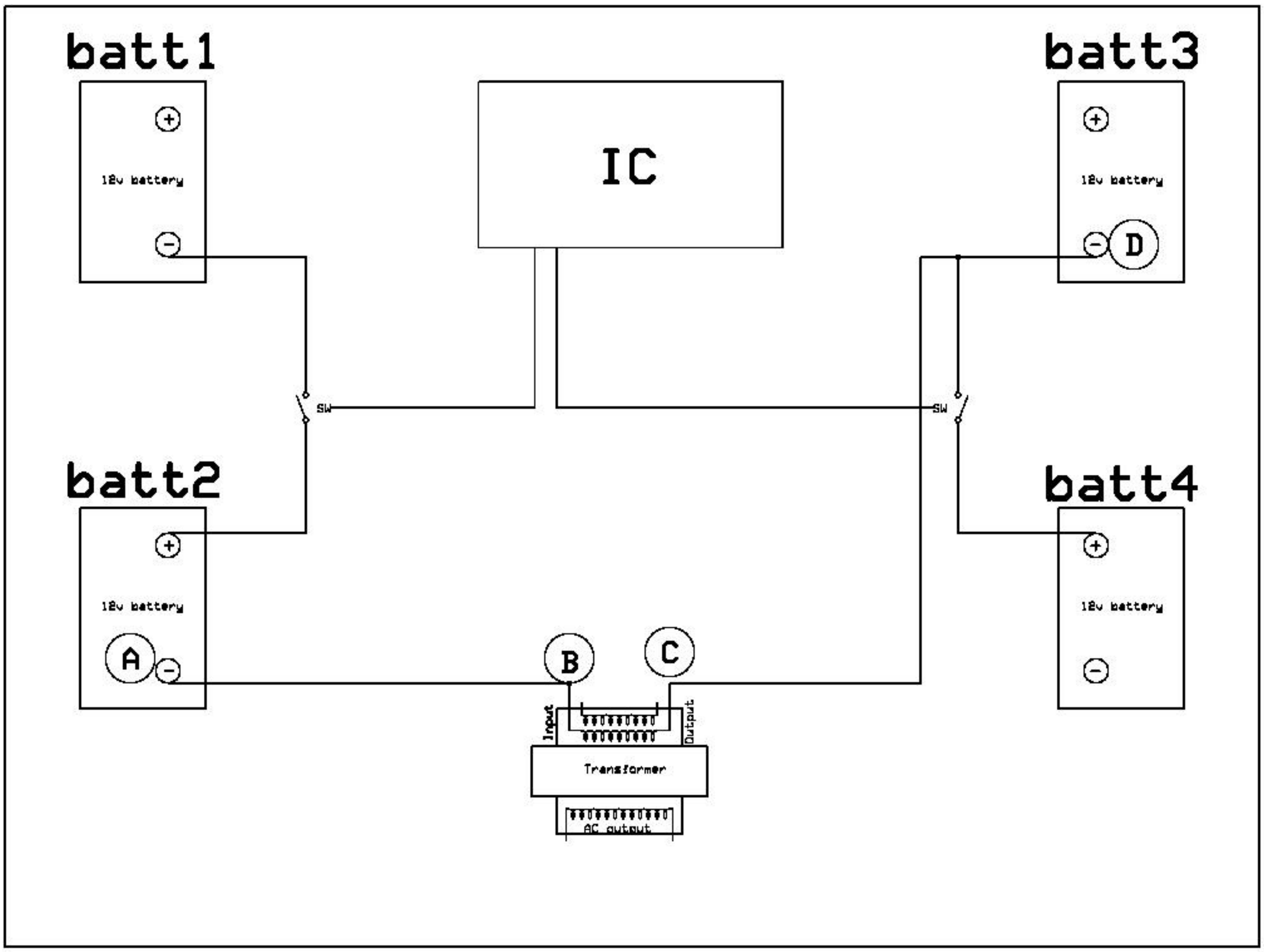


Fig. 8b

Make sure the wire coming off of the ground of batt 2 (Point A) goes into the start of the transformer windings. The end of the transformer winding (Point C) goes to the ground of the batt 3 (point D).If it is not wired this way you run the risk of burning your switch's so please correct the issue for your sake.

Now the other side .....

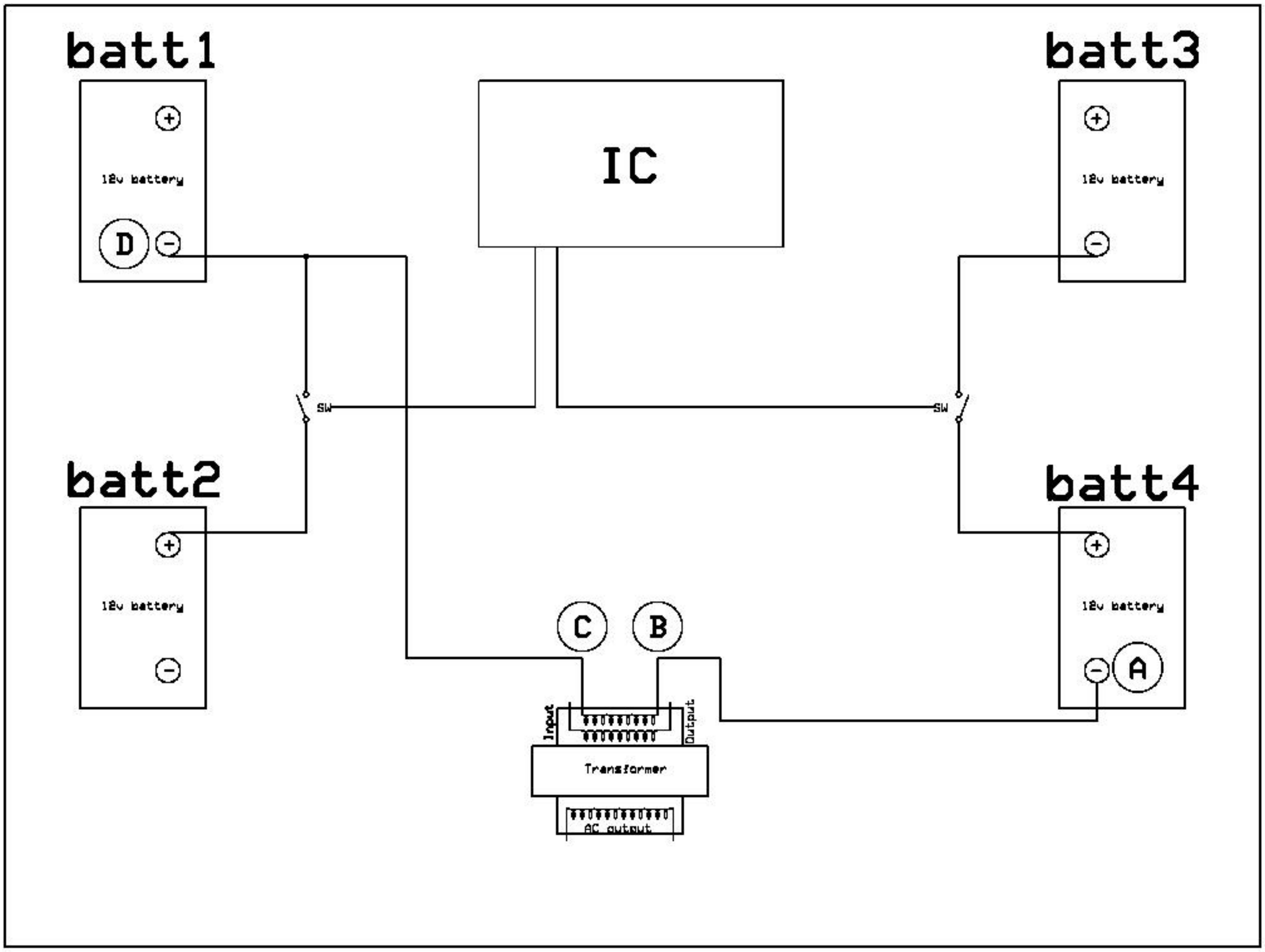


Fig.8b

This is the same visual test but we are running in the other direction so make sure to keep that in mind.

Check to see if the ground of batt 4 (Point A) is hooked to the END of the windings on the transformer (Point B), and that the Start of the windings (Point C) is hooked to the ground of Batt D.

This is connection scheme is really critical. If you have wires backwards you will create a scenario that produces immense SURGE currents and you will burn your switch's and could possibly set a battery on fire. VERY BAD...VERY UNHEALTHY...VERY EXPENSIVE mistake.

So make sure you check and double check. I can wire one of these blindfolded and make it work but I always triple check those connection, because I have seen the worst of it.

If everything checks out your just about ready to run.

Now go into your compiler (the software that runs and programs your IC) enter the code we went over in the IC section. Compile and run.

Your bulb in the circuit should light up. Maybe not bright but light up none the less.

Now your running, are you proud of yourself? You should be...

TUNING.

Now tuning is no big trick. We just need to watch the voltage coming out if the transformer. Remember the voltage coming out of the transformer is AC. Then we rectify it to produce DC and run our DC load, the light bulb.
Set your meter to AC voltage and hook it to the output of the transformer. It does matter which leads you use just hook one to one side and the other to the other side. Make sure you have voltage showing.

Now remember your code:

BS2
Do
Pulsout 1, 1250
Pulsout 2, 1250
Loop

PIC
Do
Pulsout 1, 250
Pulsout 2, 250
Loop

The second part of the "pulse out" command is the time statement. You will want to first adjust this down by a percentage. I am going to show 1 line of code but of course your going to this on both lines.

BS2
pulsout 1, 1000

PIC
Pulsout 1, 200

Now we lowered the speed of the pulse making it a shorter on time, to 2000 microseconds.

Look at the Meter. Did your voltage go up? Down? or stay the same?

Most likey at the speed we are using it went down, but if it went UP or Stayed the same go ahead and lower the time factor again by the same amount.

If the voltage went Down as I suspect it did you need to add time. So go ahead and add time.

BS2
pulsout 1, 1500

PIC
Pulsout 1, 300

Again watch the potential on the meter. Did it go up? Down or Stay the same.

Essentially to tune this what your going to do. Keep adding or subtracting until the potential is at its highest. If you going to fast the potential will go down if your going to slow the potential will go down. It will only start to go up right around the correct switching speed.
So you going to get close then change your time by littler fraction until you feel you are at the highest potential for your load.

That's how simple it gets.

Now I am not going to explain how to do it but if I were to use computer like the BS2 or PIC I would also learn how to read an ADC or Analog to Digital converter. This can read the voltage at the AC point which you had your meter and you could possibly write code that would tune the circuit to your load based on simple logarithmic algorithm.

But I am not going to give you that. You need to take the time to make that happen if you want it.

The last thing you need to do for yourself is write some code and make STOP program. So you do not have to reset your switch..

BS2 and PIC

pulsout 8, 10

That's it. It will then send one pulse to PIN 8 and no more. We aren't using pin 8 so everything halts to stop.
Of course the IC has way to make sure you stop running and you can incorporate that into the code and use and external button or something of your choice to stop any operation.

But again you are going to figure it out. I am not giving it to you.

So this concludes the Small Simple Switch guide.

I hope you have success and little to no problems. Once this is running you can scale it up. I will discuss further later in Part 2 of the article when I talk about using the 3 KVA version.

Remember no reward is free, work hard and reward will come your way.

Matthew Jones