STARTERS GUIDE – PART II

A GUIDE FOR BUILDING
BEDINI ENERGIZERS

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Modified and Edited by Miki on September 28, 2007
This document has not been edited by John Bedini.

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INTRODUCTION

This document has been put together to both assist ‘new users’ in their exploration of the Bedini SG energizers and provide a source of answers to some of the most frequently asked questions. The Simplified School Girl (SSG) is a variant of the patented Trifilar Energizer, but in fact precedes the Trifilar in the timeline development of this Technology. It is important to not confuse these 2 different circuits, or other variations of the Bedini systems, even though most of the information contained herein, relates to both of them.

It must be emphasized that the Bedini Trifilar SG or SSG are not over-unity (OU) systems. They are only one-to-one energy shuttle systems. They use one charged input battery to charge 4 or more output batteries. When set up properly, one pays for 1 and one gets the input back and three or more others for free.

The energizers are never going to show OU themselves...!!! The OU shows up in the batteries energy capacity. They last longer and take less time to charge - until they get to the point of getting 4 or more charges for the price of one!! The sooner EVERYONE understands that, the better.
This important fact needs to be understood by anyone embarking on this project. The expectation that it (the energizer) is an over-unity device has led to some misunderstandings previously.

John B. designed the Trifilar SG with the Capacitor Pulser and SSG variants as ‘proof of concept’ to demonstrate and prove his method of capturing radiant energy and get the world to understand that it is the high potential, almost currentless pulses that the different variations of energizer put out, that causes what happens within the charged batteries. This is very important. This is where the radiant energy manifests itself, and what ‘conditions’ the batteries.

The process that occurs in these batteries is referred to as conditioning. Once conditioned, the batteries last longer and take less time to charge, etc... Other benefits are that they will not wear out by sulfate buildup that usually occurs with standard DC charged batteries. They do not suffer from the depletion of water by evaporation from heat, generated by the charging process the way conventionally charged batteries do.

The information contained in this Guide is meant to teach the basics by getting a small ‘proof of concept’ SSG or Trifilar SG energizer circuit up and running, without spending large sums of money. It will also provide pointers on how to scale it up to a more useful size and larger batteries, after one learns the basics with a small setup.

The best place to start is by referring to the Peswiki site which can be found at: http://peswiki.com/index.php/Directory:Bedini_SG and the information there relating to parts sources, the schematics, and construction details of the Bedini SG. There is supplemental information that should be read below.

Warning!!! Be Careful, Batteries are dangerous, bad batteries can explode, etc..... Wear safety glasses. Keep a gallon Jug of Water mixed with 3 heaping table spoons of Baking Soda handy, to pour on Acid spills, or on you if you get Acid on you...!!!!

For ease of reading, the document is organized in sets of notes. It is important also to bear in mind that nothing in this document is final. There will be changes as we progress in our understanding of this phenomenon and technology.

PRELIMINARY NOTES

- You should make a point to read several postings of whichever Bedini boards you can gain access to. Trawl the Keelynet site for all Bedini references. Google for all Bedini references. Slowly assimilate all that you can find. Read the 3 related Bedini Patents, and the MEG patent. Read the Websites by John Bedini. Read Tom Bearden's Book Energy from the Vacuum. http://www.cheniere.org/. Read the EVANS EQUATIONS OF THE UNIFIED FIELD THEORY for the Physics that describe why Bedini's energizers work. http://www.aias.us/ http://atomicprecision.com/

- Read the battery bible, and other battery related files. http://peswiki.com/index.php/Directory:Bedini_SG:Battery_Characteristics

- Download it all (for personal use only!!).

- Once done, you will find that a great many of your likely questions would have been answered. The more you look, the more you will find. The more you re-read the more you start to see some things you may not have appreciated the significance of the first time around. We don't mean this to sound unfriendly or to alienate somebody new to the scene, but building or working with these devices, the Bedini Trifilar SG or SSG, is meant to be a learning process. Part of this learning process is personal reading, along with actual experimentation. There is so much to study on this subject, it's a daunting task.

The followings are some useful additional pointers which will improve upon the information available elsewhere.

NOTES ON BATTERIES

Batteries are the most important component of any energizer. Unless you understand how to treat the batteries properly, you will fail miserably. The following are the *'Battery Rules'* which ***MUST*** be followed in order to see the 'Bedini' effect.

- For energizers with a small amperage draw (between 0.4A and 1A) and representing good value for money, try garden tractor size type U1L or U1R. A bank of 4 new ones will drive a small inverter running a 13W, CFL (Compact Fluorescent) type light bulb for 20 to 24hrs.

- As a 2nd choice for very small amperage draw energizers, the simple conventional 12V 7Ah to 12Ah sealed lead acid gel cells are a good choice. The downside is that although these are readily available, they aren't really portable to larger energizers. They are still a practical size for new users to kick off small projects.

- As a third choice, buy RV/marine deep cycle type batteries (generally available in 12V size). There may be some merit in paying slightly more and going for golf-cart type 6V type.

- Regardless of battery size and type, a critical factor is the rate of current draw from the drive battery (and equally the rate at which the charged batteries are load tested).

- For optimum results, the rate must not exceed C20 – C24 (as explained below).

- JB has previously stated a preference for the Interstate brand of any size, but not for the Exide brand.

- It is best to start with brand new batteries as old batteries can take a very long time to de-sulfate first, and thus results may take a very long time to manifest themselves. (Once you better understand the processes you can always go back to such batteries).

- Batteries work best when in matched sets of 4 or more per bank and 2 or more banks.

- Running the energizers on 24V will pull more current, and will charge the batteries better, but you have to stay under the C/20 for the size of 1 battery, even though they are 2 in series.

NOTES ON BATTERY CAPACITY

Before we go very much further, we need to raise the issue of claimed battery capacity against the 'real world' and exactly what the C rate figure is all about. For ease of typing C/20 i.e. one twentieth of C will, hereafter, be typed as C20.

- **The C20 discharge rate for small capacity batteries** – John B advices about small batteries that would be used for his project as followed: Take the batteries Ah capacity rating figure – say 7.0Ah. Base your calculations on 80% of this figure i.e. 5.6Ah.

- The C20 figure i.e. the discharge rate such that the battery will last 20 hours, is based on this 80% capacity figure. This figure is one that is sustainable without damaging the battery. Thus, in this case the C20 rate is 0.28A.

- Do not discharge these small batteries below 12.0V under load. (12.4V is better. See below)

- **The C20 discharge rate for starter type batteries** -These include car, motor cycle, garden tractor and special purpose RV type batteries. You must take the cold cranking amps (CCA) and divide that figure by 20 to get the Ah rating of the battery e.g. for a battery rated at 560CCA, the Ah rating is 556/20 or 28Ah battery. By dividing the latter value by 20 again, we determine the actual C20 rate, which in this case corresponds to a figure of 1.4A.

- With a starter type battery, you can only furnish 20% of its rated capacity for a full discharge. A true deep cycle battery could utilize 80% of its rated capacity, but starter batteries when discharged under load to 12V are effectively dead.

- **The C20 discharge rate for RV/Marine batteries** – You might think you're getting a 100Ah battery but in reality such batteries actually turn out to be about 35Ah, at best and you can only efficiently draw about 1.4A steadily from one of them. This will give you 20hrs of run-time at that amperage. Usable yes, but it is a lot of physical bulk for such a small amount of usage c.f.

- If you have SEVEN deep-cycle RV/Marine batteries in parallel, you can draw about 150W for 20 hours without heating or hurting them. On the other hand, just TWO 6V golf-cart batteries can give you a genuine 230Ah at 12V. You can get the same 150W for 20 hours from JUST those two batteries, without hurting them.

- **The C20 rate for true deep cycle batteries**: TRUE deep cycle batteries can be pulled down at their C20 rate under load to 5.25V on a 6V battery or to 10.5V on 2 series 6V cells at 12V with out hurting them. These are minimum figures, but in practice, do not pull them down more than 5.5V or 11V under load, leaving the rest as a 'buffer' margin of charge in the battery. Stopping at 12.4V during discharge on any Bedini energizer makes charged batteries perform even better. (See below)

- The golf cart batteries require a bigger energizer to charge them effectively but, given enough time, a small energizer could charge them. Regardless of the calculations method used, the only real way to determine the actual Ah rating of a battery is to carry out a timed load test, at a given current load. This load can be a constant current tester or even the non-constant current loads of the Energizer coil or inverter although the current will vary somewhat as the battery runs down with these loads.

NOTES ON BATTERIES AND COILS IMPEDANCE MATCHING

- Ideally the impedance of each coil should match the C20 rate for the batteries.

- As previously indicated, the small 7.0Ah gel cell types have a C20 rate of 0.28A. That is the maximum discharge rate allowed under the C20 rule. The coil specified on Peswiki comes under this value and thus is well suited for new users.

- Obviously larger batteries with higher C20 rates will support larger coils or those with heavier gauge wire or more than one coil (for now stick with the one coil). As a quick rule of thumb, Roamer has suggested to buy 100ft of 18AWG twin speaker cable from Radio Shack and make the coil for larger batteries.

- Basically, bigger wire coil implies higher RPM and more current. Multiple smaller coils imply higher RPM and less current draw per coil but more overall than just one coil (see notes below).

- All this depends on your rotor, the number of magnets, etc… with regards to where the 'sweet spot' RPM and amperage is going to be for a given coil size or number of coils running at that 'sweet spot' RPM.

- As a further example a coil or coils that draw 1 to 3 amps (as shown on a DMM), will charge a deep cycle golf cart size battery bank. This amperage draw does not even get close to the C20 rating of the battery bank, so that the rest of the charge in the battery can be used for other loads at the same time as charging the other bank(s).

NOTES ON LOAD TESTING

- **New method,** for small coils, use an inverter with a wall wart or small power supply, or standard charged batteries that are recharged from SSG charged batteries through the inverter and a standard trickle charger...... or from the wall, and then run the SSG energizer from the standard charged Batteries only.

- Per JB, because of the Negative Energy involved, SSG charged batteries **should not** be used to directly drive a SSG energizer...!!! Use an inverter running from SSG charged batteries, to power a 12-24V power supply running a SSG energizer. This limitation does not apply to Trifilar-SG or Cap Pulser charged batteries. Remember this when reading below about load testing, as this is a New Development from when the Load Testing Instructions were written for both SSG and Tri-SG Cap Pulser energizers.

- Take one of the two batteries you intend to use and give it a thorough standard DC Charge, and load test prior to any experimenting. Unless the batteries are brand new and fully charged ready to go, it is recommended that a load test be done first. Also checking the Specific Gravity on one or all cells before and after each charge cycle is a good Idea. Doing these things will provide a baseline against which, future changes can be monitored.

- You can use an LM317T based device as a Constant Current Source circuit for small batteries. Information on this can be found on the datasheet provided by the manufacturer and available from their web site. You need to allow for the voltage drop across the device so don't use 12V to calculate the required resistance value use say 10.4V instead.

- Alternatives to fixed resistors are: car brake (tail) lights or lantern lamps, Electric Stove Heater Elements as many as needed for the load.

- An LM338 5A regulator will work for testing larger batteries at higher amperage loads. This will need mounting on a suitable heat sink as will the high wattage current regulator resistor(s) with a 5W 25ohm rheostat.

- An inverter running a 13w CFL light, or other suitable current draw load will work, but not for rigorous Constant Current Load Testing.

- Just in case you hadn't "caught the drift" so to speak, your energizer's current draw *must be less* than your drive batteries C20 rate for this to Work!!!

- After the first baseline test at C20 constant current load test on each battery in a bank, if the batteries lasted between 20 and 24 hours before it got down to 12V, then you are in the right window.

- If it did not last 20hrs then try a lower current setting on the constant current load, if it lasted more than 24hrs, then try a little more current next time or on the next battery of the bank.

- If discharging a parallel connected bank, then multiply the "determined" C20 of each battery in the bank, for the total load current to use.

- Once the correct C20 discharge rate has been "determined", then ALWAYS use the ***EXACT SAME LOAD CURRENT*** every time.

- Clearly you will need to start a system of recording battery details to track improvements in the batteries performance.

NOTES ON THE BATTERY CONDITIONING PROCESS

- Although the Peswiki site and the Bedini SG schematics only detail one drive and one charged battery, this really is an absolute minimum.

- It is possible to use 110V or 220V to 12V "wall wart" power supply as the "the input source", which with two batteries form a 'minimum practical requirement'. Having 2 batteries available to be charged is, at the very least, advisable so that you have one available to charge while load testing the other.

- Consideration should be given to extending the charged side to ideally 4 parallel batteries or even two banks of 4 parallel batteries, again allowing one bank to be load tested whilst charging the other.

- The larger the battery bank the longer it will take for the batteries to charge, but the larger bank does offer less resistance/ impedance as per Ohm's Law. (For the sake of argument we can consider resistance to equate to impedance for our purposes).

- Thus start charging the battery(s) with the energizer powered either by the 12V wall wart or a 12V battery backed up with a mains powered trickle charger. Keep charging until the battery(s) get over 15V.

- The batteries may go over 16V for the first few cycles, but will only want to get into the over 15V range after that, after many, many cycles the batteries may not want to get to 15V and may only get to 14.75V or so, and then they will be fully charged, no matter how long you let it run.

- While super-charging/conditioning in the beginning, the voltage may fluctuate up and down widely before leveling off at some lower voltage and then staying there and "cold boiling" during any given cycle.

- When charging at 14.75V - 15V or more, the batteries cold boil, out gas, and some of the bubbles are like a fine fizz floating up off the surface of the electrolyte (and will splash droplets all over the place, if the cap is left off......) ***Wear Safety Glasses !!*** While cold boiling, the batteries stay at room temperature or less, and do not get hot like standard charged batteries.

- ***NEVER*** discharge these small batteries below 12.0V under load or faster than the C20 rate of discharge. If you do it will take a **LOT Longer** to charge them next cycle. It is best to stop at 12.4V. Larger Deep Cycle batteries do not have this limitation and can be discharged at a higher than C20 rate.

- Then remove them from the energizer (if only charging one battery you will need to disconnect the power source!!!!!) and subject them to a timed load test and record.

- This gradual process will need to be repeated time and time again to see improvements in both the time taken to charge and the time taken to be drawn back down to 12.0V -12.4V under load.

- You will see a gradual decrease in the time it takes the battery(s) to be charged to over 15V and a gradual increase in the time taken to discharge the battery(s) down to 12V -12.4V under load.

- When the battery(s) starts lasting 26hrs or more on the load test before drawing down to 12V -12.4 V , then start limiting the discharge time to 24hrs, and the battery will start having higher ending voltages in that fixed timed duration discharge.

- After a few more cycles, start limiting the charging time to 24hrs so that you have 24hr charge/discharge for a few cycles.

- Then, you start swapping banks of 4 or more batteries and using 1 battery out of the conditioned batteries of each bank to drive the energizer at 12V for 1 or 24V for 2. Then swap this one out with one of the other freshly charged batteries at timed intervals. Do discharged tests on the other freshly charged batteries of that bank, while charging 3 more discharged batteries along with the discharged drive battery(s). Keep swapping them out at a 6hr or 8hr time intervals between the 2 banks in charge/discharge positions.

- For the discharge of the rest of the batteries in the bank, you can now use an inverter in place of the constant current load, running a 7W or 13W CFL(s) for the load depending on the total C20 size of the bank of batteries (***NEVER EVER draw*** more current than that total C20 current rate). If you do, it will take a LOT longer to charge them on next cycle.

- At this point, after many, many charge and discharge cycles, the conditioned batteries should run the energizer and the load continuously by themselves, by swapping banks in 6hr- 8hr time charge/discharge cycles.

- The conditioning process to get them to this point, may take 2-4 months or more, depending on how many batteries in the bank, size of the batteries, condition of batteries to start with (new -old), current draw of your Energizer, etc...

- Once the battery(s) become conditioned, more conditioned batteries can be added to the bank and the energizer will still manage to charge this larger bank almost as effectively as it did the smaller bank. ***ALL*** the batteries need to be similarly conditioned for this to work.

- One way of speeding up the conditioning process if you have a large number of batteries is to use two or more coils on the one energizer rotor with one coil to each bank of batteries. Use different drive supply sources for the 2 coils. "See notes below". Do not forget if driving both energizer coils with one battery, you will still need to keep within its C20 rate.

- Once conditioned, the batteries will start to operate in a Different part of their charge / discharge curves, and take a very long time to drop below 13V to 12.9V during discharge, **and will have a Standing Voltage of 13V to 13.5V, 4 hours after a full charge...! Normal Fully Charged Standing Voltage is 12.7V or less, after 4 hours....**

- Once extensively conditioned, do not try to charge the battery(s) with a standard mains powered DC battery charger, as this will slowly undo all the good work it may have taken months to achieve!!

- If left unused for a long period, the conditioning will slowly go away, the same way any battery left unused will slowly deteriorate.

- The machine you are building will bring down the impedance of the battery. This is how the conditioning takes place, it drops the internal impedance of the cells, and no real current is needed to charge the battery this way. This lowering of the batteries impedance occurs as a result of the crystals in the plate material changing size as the battery charges and discharges, becoming smaller as the conditioning process continues.

- Conventional **DC** charging/discharging of a battery generally leads to these crystals becoming larger over a period of time and not dissolving so readily. In a sulfated battery, these crystals have grown so large that the electrolyte is less able to react with the battery plates, the impedance rises and you have a battery that cannot hold a charge. Thus, with any of the variations of Bedini energizer conditioning process, these crystals get smaller and smaller, lowering the impedance of the batteries and enabling them to hold more charge.

- A point will be reached where these crystals will become smaller than when the battery was brand new. At this stage the batteries start to develop a negative curvature of space/time around the crystals and plates. Further ‘conditioning’ with the energizer will result in the batteries lasting longer and longer on the load tests and taking less and less time to charge, and having a higher Standing Voltage, 4 hours after a Full Charge.

- Also the Negative Energy Dirac Hole flow through the local space-time to the charging battery fills the Battery with NEGITIVE ENERGY DIRAC HOLES that also place more negative curvature of the local space-time around the crystals and plates according to Bearden's EFTV. This means lower and lower impedance, smaller and smaller plate crystals, which implies negative curvature of space / time around the crystals and plates, which implies ***NEGATIVE RESISTOR.***

NOTES ON BUILDING THE ENERGIZER

The trigger that makes the magic in the batteries

The following information is meant to supplement that found on the Peswiki site.

- You don't necessarily need a spool as large as specified on Peswiki for a small device. You can use the spools on which the ECW (Enameled Copper Wire)/ magnet wire is supplied. In Europe this is commonly a 500gm spool which is 2 ¼"X 2"X5/8" for length, diameter, and inner core respectively.

- You can make them from ½" CPVC hot water pipe as the core coil form. Using a 2" hole-saw you can make the ends from any suitable material such as plastic electrical boxes, Plexiglas, or for larger diameter coils use 3 CD-ROM glued together with PVC glue. Remove all the non-plastic foil portion of the CDs.

- Use the Bedini approved Coil winding instructions in the Bedini SG group files, in the Lee folder, named: COIL WINDING.GIF "How to wind coils for SG variants" http://tech.groups.yahoo.com/group/Bedini_SG/files/Lee/

- The following may assist in understanding: An electromagnet is simply a coil of wire. It is usually wound around an iron core. When connected to a DC voltage or current source, the electromagnet becomes energized, creating a magnetic field just like a permanent magnet.

- The magnetic flux density is proportional to the magnitude of the current flowing in the wire of the electromagnet and the number of turns of wire. Its DC resistance is determined by the size and length of the wire. The polarity of the electromagnet is determined by the direction of the current. The north pole of the electromagnet is determined by using the right hand rule. Wrap your fingers around the coil in the same direction as the current is flowing (conventional DC current flows from + to - as described when the right hand rule was invented, before electron current was discovered. Electron current flows from - to +). The direction your thumb is pointing is the direction of the magnetic field, so north would come out of the electromagnet in the direction of your thumb.

- Despite what it says on Peswiki you can put splices in the wire to make up coils. However, you should avoid doing so. If you must, then make sure the connection is soldered properly (having scraped the enamel off first) and that it is adequately sleeved w/ heat shrink tube on completion or painted with a compound such as nail polish.

- The coil core can be 'stuffed' with differing materials and will still work. Stick with using 1/16" – 1.6mm copper coated steel (CCSW) Gas Welding rods (also called filler rods) e.g. Lincoln R60 specification (John B. recommends this as the core material to be used). They **SHOULD** be painted to reduce eddy currents or possibly left to 'rust' for a period prior to use. Other materials can be used but check with a magnet first. If the materials retain any magnetism when the magnet is taken away, then they are not suitable. After having used it as a core material for a little while, check the core with a compass to see if there is a preferred direction of the needle attraction to one end of the core or the other. If there is, then that core material is not suitable for using in a Bedini SG. However, if both south and north attract to the core ends, then such core is suitable.

- The North Pole of a magnet is the one that causes the red or north seeking end of a compass needle to repel. The following link may assist your understanding – (http://www.kineticbooks.com/physics/16958/16969/sp.html) (this link is no longer good, needs another)

- The energizer will run with the magnets S pole out, but you will need to reverse your coil circuit connections, or reverse the coil end facing the rotor, however John B. must have a good reason for going with a North Pole energizer so let's stick with it.

- **DO NOT USE NEODYMIUM MAGNETS** – John B. has stated on more than one occasion that neodymium magnets saturate the core of the coil and cause the transistor to cross conduct unless you have a ½" or greater gap. Thus stick with ceramic Grade 5 or 8 types.

- Ideally the magnet width should be equal to or greater than that of the coil core. Rectangular magnets give an improved performance over simple discs because you want the magnet field to sweep across the entire face of the coil or close to it.

- **Don't** space the magnets closer than 1.5 to 2 magnet widths apart. Just take this 'as read' at this stage of your learning. Briefly it has to do with interactivity of the scalar south poles. They can be a little further apart on a larger diameter rotor like a bicycle size wheel.

- Double or triple stacking the magnets on the rotor will increase the magnetic field and thus the effects on the coil trigger winding.

- If using a MDF (Medium Density Fiberboard) type rotor make one out of more than one thickness and use larger size rectangular magnets. Make a 4" diameter rotor from 3 thicknesses of MDF and use 1.95 x 0.75 x 0.38" magnets or close, some magnets come in mm sizes and will measure close to this. This should run on skate board bearings embedded in the sides of the rotor, so that only the rotor turns.

- Another possibility is to use 2 off-the-shelves 60 - 70mm fat skate board wheels, mounted on each side of the rotor, and clamped down to the frame so that the shaft turns with the rotor, running on the 2 skate board wheels bearings. Thus the rotor is running on a total of 4 bearings, 2 per wheel. Then the shaft can be used as a timing pulley or to run a small G-field generator.

- Almost anything round and non-magnetic can be used as a rotor. For example, 113mm Big Slick off Road Skate Board Wheels, with a little grinding or machining of the rubber to accommodate the magnets, make good 3 or 4 pole rotors.

- Basically smaller diameter, 3 or 4 pole rotors run at higher RPM and draw less current than say a 6 pole 6" rotor.

- This may be an important consideration in keeping the current draw down, below the critical battery C20 rate, on the smaller batteries.

- Finally it is a wise precaution to wrap some kind of heavy duty strapping tape with the little strings imbedded in it, or even electrical tape around the perimeter of your rotor as a back-up to gluing the magnets in. To get this in perspective, a small 4 pole rotor at 24V can achieve 3-5000RPM – a magnet would make a fair missile. Bicycle wheel size rotors, with more magnets, have lower RPM and are thus safer up to a point.

- Use a 1k potentiometer rated 2W minimum in conjunction with a fixed value 2W or larger resistor. Resist the temptation to go for a lower rated potentiometer. At lower resistances, the current consumption will be sufficient to melt a 0.25W carbon device. You have been warned.

- Use soldered connections or bolted lugs wherever possible, avoid crocodile clips like the plague. These may be adequate for temporary connections for those less certain electronically, but once the device is proven to work make all connections permanent.

- Additionally use suitable Anti Oxy Conductive Grease for all bolted or spade lug connections, battery posts or other cable connections. This will keep the corrosion at bay and keep the system impedance down.

- Use the largest diameter cable you can find for each part of the circuit, except the trigger. If possible use the High Strand Count Monster Cable as those used on Thumper Car Audio systems. This is particularly important for connections to and from the batteries.

- For small batteries, use 10AWG or 8AWG. For Golf Cart size batteries, use up to 4AWG, 2AWG, or 1AWG. For still larger size batteries, use 0AWG, 00AWG, 000AWG. These will need to be used with suitable soldered or crimp on lugs (soldered has to be the best route, although some of the larger 120V inverter installation instructions, advised to not to solder the Lug connections.). When crimping on, use the Anti Oxy Conductive Grease packed into the strands, and then slide the Lug on and crimp it down, then use heat shrink tubing on the ends.

- Keep all connections short, between components, batteries, etc... Use big cables for unavoidable long runs. Remember impedance is everything. Resistance/impedance plays a major part in this process. As you scale up this becomes ever more apparent.

- This is a précis of Roamer's advice on adjusting the gap between magnet and coil. To set the device up prior to running it, connect up the drive battery only. You should have built the energizer such that you can adjust the distance between the rotor and stator. Start with the smallest gap possible and start adjusting the coil away from the rotor feeling the repulsion between the magnet on the rotor and the coil as you go until the effect just disappears. Then screw the coil back in away for a very slight repulsion effect. Tighten things up at this point.

- This method works better with experience. Even if done to the letter as indicated above, your first attempt at running the energizer will not be without difficulty. In which case you will need to adjust the coil back in towards the rotor some more. The aim is to have the energizer running with the absolute minimum amount of current being consumed from the drive battery.

NOTES ON TUNING THE ENERGIZER

Tuning the energizer – is the crux. On small energizers, if you set-up the device with a base resistance of 680ohms it should run 'straight out of the box', it will very likely not be perfectly tuned but it should run.

- **Roamer's Method -** Again I précis Roamer's advice in this regard: You will need an ammeter and an AM radio as a minimum, a PC based oscilloscope program with an isolation circuit or an oscilloscope does make things a bit easier.

- Hook the latter up with the negative or ground to the negative of the drive battery and the positive to the collector of the transistor. In the case of the radio switch it on.

- Give the rotor a spin and it should pick up on its own accompanied by a 'chirruping' sound on the radio or the appearance of pulses on the oscilloscope display.

- You may get lucky and it be perfectly tuned/ in resonance from the start but this is not likely. Once up to speed the radio will be double or triple chirruping and the oscilloscope display showing multiple pulses. You should adjust the resistance down in small amounts and all the while listening/ watching as appropriate and also watching the ammeter. Allow the device to stabilize each time. The first time you carry this out be prepared to spend a fair amount of time getting this right.

- You should note a change in current consumption, probably upwards as you decrease the resistance. You will reach a point (again with experience you will recognize the 'break' point) where the ammeter reading will start to fluctuate slightly and you will hear a degree of instability in the sound from the radio or oscilloscope trace.

- Keep screwing the resistance down and, as if by magic, the current will suddenly drop followed by the rotor picking up speed, the chirruping changing to a single chirrup/ oscilloscope trace and the current consumption start rising again and leveling off.

- You've made it, go and have a drink and relax. Come back and stop the energizer and then start it again. You should find you have a triple chirrup/triple pulse; the current will slowly build up, then drop and build up again as the rotor speed picks up.

- You can then continue to reduce the resistance in small amounts and observe the current consumption drop. You will reach a point where the device will break out into instability again and you will then have determined a range of operation.

- Start from this lower end. As above stop the rotor and then start up again and see if you have the triple spike start scenario. If not wind the resistance back up a bit and try again. You will find a point where it will do the triple spike thing again.

- This is the point where you should run the energizer as this will be the minimum current draw.

- **RS's Version -** RS's version of tuning is as followed – ('New Users", please ignore the references to lamps and larger energizer instructions for now).

- On small SSG or Trifilar SG energizers, start with 1K potentiometer and 10 ohm base resistor, (larger energizers that pull 1A or more, start with a 25 to 100 ohm potentiometer, and 1-5 ohm base resistor).

- Turn the potentiometer down to its lowest resistance point, then back up just a little, and spin the rotor. As the rotor speeds up, tweak the potentiometer up in resistance little by little, so that the rotor continues to increase in speed, and the current keeps dropping.

- Adjust the fixed value base resistor as needed to get the potentiometer (and/or lamp) into their sweet spots. (see notes below)

- At some point the extra pulses will start to show up, when they do, back off on the potentiometer a little and let it stabilize a while, then try tweaking it up in resistance until the pulses show up again, then back off just until they go away, and that will be its lowest current, highest RPM 'sweet spot'.

- Per JB, the 'sweet spot' is a narrow window, where tuning the potentiometer a little lower in resistance will pull a little more current and run at a little lower speed, but past the window, the current rises too fast and the speed starts dropping.

- This window is like a bell shaped curve, if you are too far over to the right on the bell curve the charging will be poor, get on top of the bell curve and the charging will increase. Go too far over to the left on the bell curve, and the current rises too fast and the speed starts dropping fast.

- The transistors should fire at the point 1/2 way between magnets, on top of the super South Pole between the magnets. To check this, you can put white marks at the TDC point of the magnets, and at the 1/2 way point. Then use an automotive timing light with the inductive pick up hooked around the coil wire, right before it gets to the transistor collector.

- If you are not finding this sweet spot window, then tweak the base resistor (or the size of the lamp - Radio Shack has various amp/watt rated 14V lamps, Auto parts stores have the bigger size lamps and some of the smaller sizes). Different size energizers will require Different size Lamps.

- This "Sweet Spot" tuning is not definitive, there may be some merit, on some small units, of letting it run in a double or triple pulse mode, at a some what higher amp draw and lower RPM. Some batteries may respond to this better, than the single spike, lowest current, highest RPM Sweet Spot that most units should be tuned to.

- Measuring the current drawn by the device is readily achieved and actually an essential part of operating the energizer efficiently, don’t bother trying to measure the ‘current’ out to the batteries being charged. The nature of the energy going to the battery is not properly represented using conventional instruments. Radiant energy is best described as being like ‘bit’s of electricity, it is said to be electron deficient thus conventional devices i.e. oscilloscopes and DMM (Digital Multi-meters) struggle to ‘see’ (although analogue meters are better suited apparently).

- Similarly not much can be usefully determined by monitoring the voltage level in the output batteries other than as an indication the batteries are charging. Do not leave the DMM hooked to the circuit, just check it and remove the meter. The energizer or a capacitor Pulser will see the DMM as just another load to drive, and thus the batteries will not see all the energy. Do not leave a current meter on the energizer ether, remove it after every current measurement, unless you are using an inline current shunt, and then disconnect the meter from the shunt only.

- Avoid the temptation to leap ahead, patience is definitely a virtue. Point worth repeating - It may take several months to “condition” your batteries. This will involve many charge and discharge cycles (as detailed above), and is truly like watching a pot boil, you just have to leave it alone, and let it sit there and run for a while.

NOTES ON ENERGIZER UP-SCALING

- Perhaps the next stage should be to “go back” and build the original “School Girl” motor. In our rush to go “bigger and better”, we may overlook the fact that this motor ran for five days on the one battery. See www.keelynet.com/bedmot/bedmot.htm. This isn’t ‘compulsory’ but you may learn something in the process.

- Also adding a small generator coil with resistor and LED as a light load, as shown in the Original SG Schematic, could lower the current draw of your energizer. For a small SSG or Tri-SG, this is a good highly recommended test.

- The Bedini Monopole Energizers are **NOT Torque Motors**, but will respond favorably to a very Light Shaft Load, with a lower current draw at a given speed. This is not a normal feature of standard Torque Motors. The light load and generator coil tests in addition to the Original SG LED test coil, should be done with a very high turns ratio coil, or bifilar / trifilar series adding connected coil, mounted next to a SSG or Tri-SG rotor, feeding a FWBR into a Full Patent Cap Pulser circuit, that is charging another battery or bank of batteries. Or a small G- Field Generator / Cap Pulser unit, driven from the shaft of a larger multi coil SSG or Tri-SG unit, charging another or two banks of batteries.

- The next progressive stage is to go the Bedini Trifilar SG (Tri-SG) energizer as per US Patent No. 6,545,444. This is a very different beast from the bifilar coiled SSG. It needs to be studied along with the SSG, so that one develops a fuller understanding of the different variations of the Bedini process and applies all these processes in a more advanced setup.

- The third winding on a Tri-SG is used to deliver energy to the battery via a full wave bridge rectifier (FWBR) and a storage capacitor, which is then switched to dump its energy into the output batteries. With the Cap Pulser in standard or inverted mode, this switching can be achieved in at least three ways:

- **Neon lamp triggered Thyristor**: when the capacitor is charged to 90V the neon lamp triggers the Thyristor and the capacitor content is discharged into the battery.

- **Using a 555 based circuit and a combination of transistors/ SCR** as per mono-pole11 and mono-pole19.jpg in the Bedini Info folder in the bedini_monopole2 board Files section, or the full patent pulse charger.

- **Apply the Full Patent Cap Pulser in inverted mode**, to fully isolate the recovery winding current loop as the Cap discharge to the battery to make it a fully regauging Circuit as per Bearden.

- A battery is, in itself, a large capacitor and an inductor at the same time, like a LC tank circuit. These short duration radiant pulses, although being upwards of 100V or more, will be readily absorbed by the battery without harm. They make that LC tank circuit ring at the batteries or bank of batteries natural frequency.

- Running at 24V with an SSG direct into the battery you have an increased voltage across the coil producing a larger spike and more frequently. Thus more of the spike is over 100V up into the 300V and higher range, this ‘smacks’ the batteries really hard and fast. Retune the lamp and base resistor if needed when moving up to 24V.

- The next stage is very probably twisting the strands and/or going to multi-strand or what are being referred to here as litzed type coils. In the first instance the two or three strands are simply twisted together. This enables better coupling between the strands and also makes the coils themselves easier to wind. Take 2 or more strands, and stretch them out in parallel, then tie one end to a post, and tie the other end to an eye bolt inserted in a drill, Then twist the wires together Clockwise.

- In the latter rather than use two (bifilar) or three (trifilar) strands of wire each strand is composed of smaller diameter strands twisted together to form a strand of equivalent ohms/length, and then these in turn twisted together to form a complete multi strand winding. This appears to improve the performance of the energizer.

- As you scale up the energizer you’ll need to consider scaling up the semiconductors being used. For the transistors, you should be looking at maybe 2N3773, 2N3584, MJ15022, MJ15024 and finally the MJ21194/ MJL21194 (this latter probably being the ‘biggest’ most readily available transistor on the market).

- On SSG Diodes and SG trifilar / Cap Pulser FWBR fast 800V - 1000V diodes can be chosen for 12V drive batteries fast 1000V -1200V for 24V drive batteries. The diode rated current range between 1A and 25A. Smaller amps rated diodes could be mounted in parallel.

- Use 5W or higher, 25Ohm, 50Ohm, 100Ohm to 250Ohm rheostats for larger coils and adjust the base resistor up or down as necessary to get the sweet spot within the correct tuning range of the lesser ohm pots. Once you have the hang of it, then fit a 14V lamp in series with the base resistance, and retune the base resistor so that they all are in range of the sweet spot current window that you had before adding the lamp.

- You want to pick a size of lamp that will glow mid bright when running in the sweet spot window. If it does not glow at all, then switch to a smaller lamp, if it gets too bright it may blow the lamp, then chose a bigger lamp. If adjusting the base resistor up and down the range of 0.25 - 300ohms does not get the lamp and pot into the their sweet spot glow window, resize the lamp, or put 2 or 3 small lamps in parallel to get the lamp resistance to the correct size. Then tweak the base resistor to get a small ohm pot back into the window.

- Radio Shack has various ma size lamps of 14V. Auto parts stores have the bigger 1A size 14V lamps and some of the smaller sizes. The trigger lamp acts like a variable resistance that helps hold the tuning at its sweet spot as the motor speeds up to lesser efficient operating states.

- The neon lamp across the coil is still used even in these larger versions SSG to keep the high voltage spikes from killing the transistors if the voltage gets too high or the charging battery becomes unhooked. When making a larger coil, for use with the higher amp transistors, use a 5.6K resistor in series with the neon lamp.

- One of the most recent improvements has been substituting the charging battery output wiring with copper tube, flattened on the ends and suitably drilled to facilitate connections to the battery terminals. The copper tubing is not easy to work with, but does work. The flattened and drilled tubing is good for various short connection busses between larger batteries as well.

- An additional Idea, based on a Tesla's finding, is to make sure, on a SSG unit, the Output Cable from the Diode output to the charging batteries has the SAME Mass to Weight ratio as the copper Coil(s).

- Finally, another viable route is to build advanced energizers involving more than one coil per rotor and coupling them up in parallel. **This is however advancing to a different level altogether, and isn't as easy as it seems**. When dealing with less than professional quality setups in which the rotor magnets or the stator coil mounting may not be perfectly aligned, the tuning for each coil may become a night mare. Specially, when each coil is powered from the same drive battery or power supply, the different pulse positions cause ghost pulses on the other coil transistors trigger circuits, resulting in all kinds of problems unless the pulses happen simultaneously.

- So if you are running more than one coil, use separate power supplies, or isolate one or more coils power hookup with a big high amperage 100V diode so that you can charge more banks of 4 batteries from the different coils around the rotor. Better, you could use only one trigger strand from one of the coils to control all the power transistors. This requires that you use 10 to 47 ohm current divider resistors on the base of each transistor right after the pot and 10 ohm resistor of a single coil setup. Once all the power transistors fire at the same time, one power supply will energize all the coils without noise interference between the coils.

NOTES ON COP MEASUREMENT BY RS

- Followed is a quote from one of John's emails: "you just need to know what you put into the machine in joules and what you get out in joules, and then add the mechanical work in". John is saying to compare the input energy (Joules) to the SG/SSG with that of the charged battery to get the electrical COP. Then add to it, an estimated 23% of shaft energy for the Total COP. Note that, the energy in joules is equal to VXAXT or W X T.

- To do a full analysis of SG/SSG input, you need a power analyzer, or a Scope that can integrate the wave form, and do the computation. This is a very expensive approach just to satisfy the critics. Alternatively, a manual analysis of the area under the curve can be done using an ordinary scope traces.

- According to JB, for what we are doing, using an analog current meter to measure the current is fine, and so long as a digital current meter agrees with the analog one, a DMM can be used. These meters are going to show an average current reading, based on the Peak

Current and the Duty Cycle. Unless the pulses are very slow, they should give a close enough answer on the faster running SG/SSG. The value from these meters will be close to that of the power analyzer, give or take ±2%.

- I also recognize that using the average reading between LTP and HTP as the V for the Joule calculations does have its limitations, and that a data logger is needed to generate better curves. Based on the V x A = W data points integrated over time, the total joules could calculated as the sum of the joules per checks multiply by the total check periods. This is where the PIC Micro A/D Current/Voltage monitor/data logger/swapper for automating these measurements is needed.

- Measuring current is not as hard as the critics would lead you to believe! The standing voltage of batteries charged by normal DC chargers, after 4hrs rest period, is 12.7V or less, and the manufacturers' standard curves reflect this value as their starting point. When the batteries are Bedini Process conditioned after many charge/discharge cycles, their 4 hour standing voltage will be 13.0V to 13.25V. The manufacturer standard curves will NOT reflect this higher standing voltage, and thus are useless for computing the stored energy. They could only be used for a comparison of the nominal manufacturer curve to the new batteries performance profile.

- I have seen various conditioned batteries stand for days and even weeks at 13V. I have also seen conditioned batteries, after a charge cycle, take 30min or more to pull down to 13V, and over an hour to pull down to 12.9V. The manufacturer's standard curves are NOT going to accurately represent this new voltage profile.

- The Specific Gravity tests will help, and a Bedini Process fully conditioned battery, will show a fully charged state far higher than the highest number on the Specific Gravity tester, and will sometimes peak it out. A BK 601 or 602 Battery Analyzer is another way to measure the batteries state of charge, as JB has said at the beginning of the SG group, and also shown in the DVD. But these measurements are not going to help with the COP calculations. According to JB, the ONLY reliable method for determining the Capacity of batteries is to discharge them into a known load for a measured amount of time to calculate their energy content in Joules.

- Per JB, Watts into the energizer to charge a battery or bank over time (Joules In) compared to Watts Output from the same charged battery or bank over time (Joules Out) is the ONLY WAY to compute Electrical COP. If the Mechanical 23% shaft energy is harvested, then it must be added to the electrical COP to obtain the total COP. Otherwise, it is a waste and should not be included in the calculations.

- Pony braking a Tri-SG / SSG, until just before the double-pulses, would show its torque. Put a DC motor on its shaft to act as a generator. Then load the generator down till just before the Tri-SG / SSG double pulses, and measure the watts gained over time. This value could be used in conjunction with the energy stored in the batteries to calculate the total output of the energizer.

- Heavily loading down the machine to the double pulse point does not work as good as a lighter load. Adding one or more high turns ratio generator coils to a Tri-SG / SSG unit, and rectifying their output through an FWBR into a Bedini Regauging Full Patent Cap Pulser can charge additional banks of batteries. When used with a regauging cap Pulser, the resulting light generator coil load **lowers** the drive current, and helps the charging rate of the SSG batteries.

- After the addition of the generator coil, one can experience a speed increase of 10-20 rpm, and lower input current. The higher speed implies higher induced voltage on the generator coil. The generator coil could also be used in a FEG Back Popping Setup similar to RF self-runner. Harvesting the 23% Mechanical energy, while loading the rotor to a minimum, is imperative.

NOTES ON SAFETY FROM FLYING MAGNETS BY RS

- I researched epoxy, and found one brand that listed the PSI directly on their web site: http://www.westsystem.com/ (7800psi) epoxy. That was the highest PSI of any that I found: West Systems Epoxy rated for a PSI of 7800. That's a lot higher than the off the shelf types at 2500psi. They also have Aluminum etch that improves bonding to the metal.

- I found also some 2" wide carbon fiber cloth tape at 200,000psi. But since this tape was electrically conductive, they suggested the use of Kevlar, and recommended: http://cstsales.com/aramid_tape.html.

- The West Systems Epoxy and the Kevlar tape have tested satisfactory and solved the flying magnets problem for speeds up to 6000 RPM. The highest speed this epoxy/ Kevlar wrap combination could handle is still undetermined.

DRAWINGS ILLUSTRATING THE ENGINEERING IMPLEMENTATION OF THE BEDINI PROCESS

In the study of this technology, it is highly recommended that one starts from the basic SSG shown in figure 1 before replicating and exploring the more advanced versions implemented in figures 2 to 4.

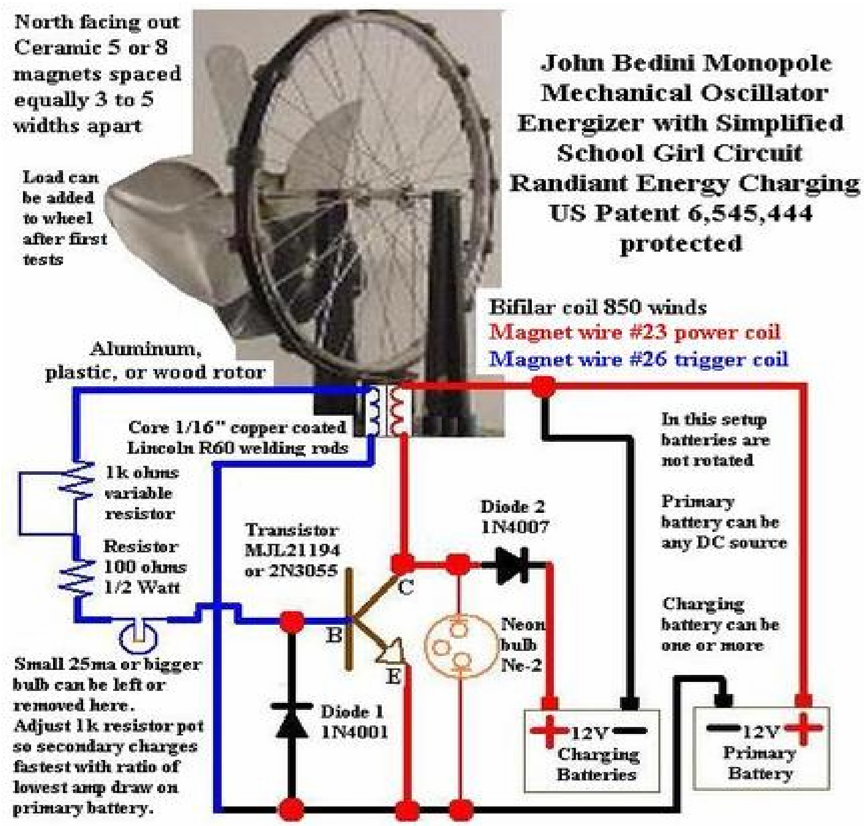

Figure 1: Simplified School Girl Energizer Diagram

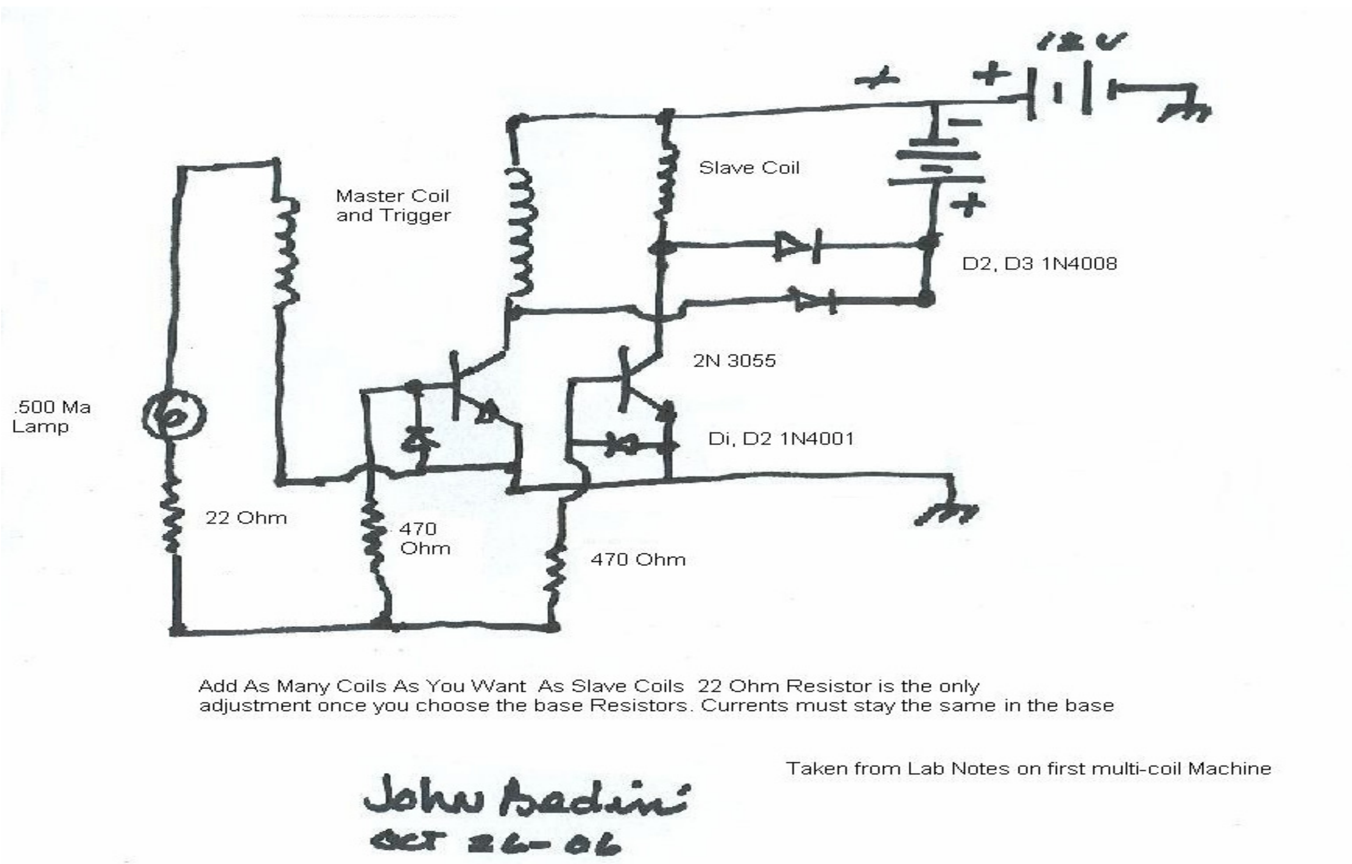

Figure 2: Multi-transistor Simple Monopole Energizer

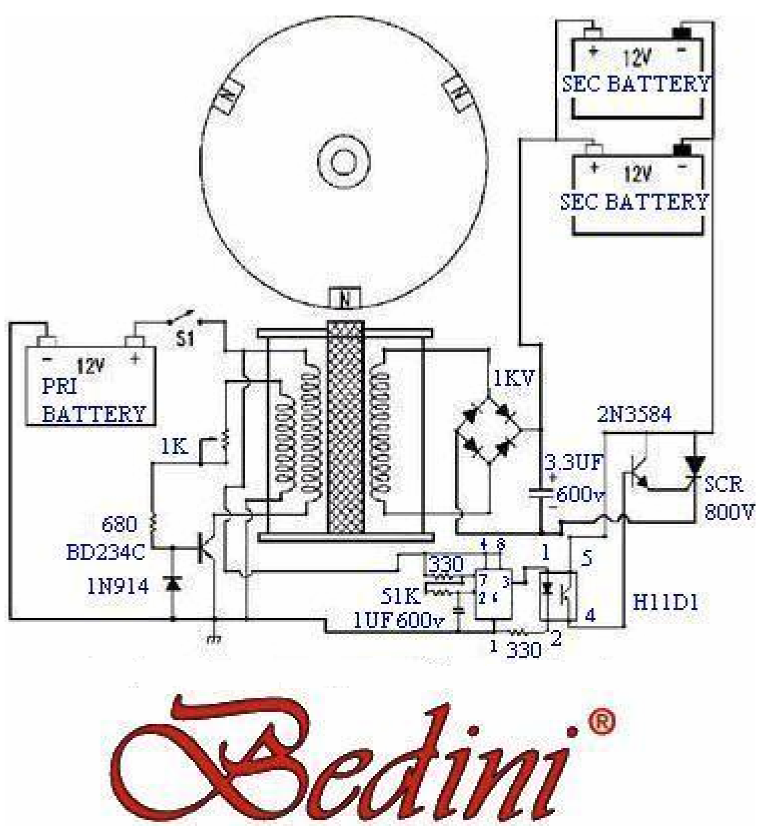

Figure 3: Schematic of a one to two Radiant Energy Generator

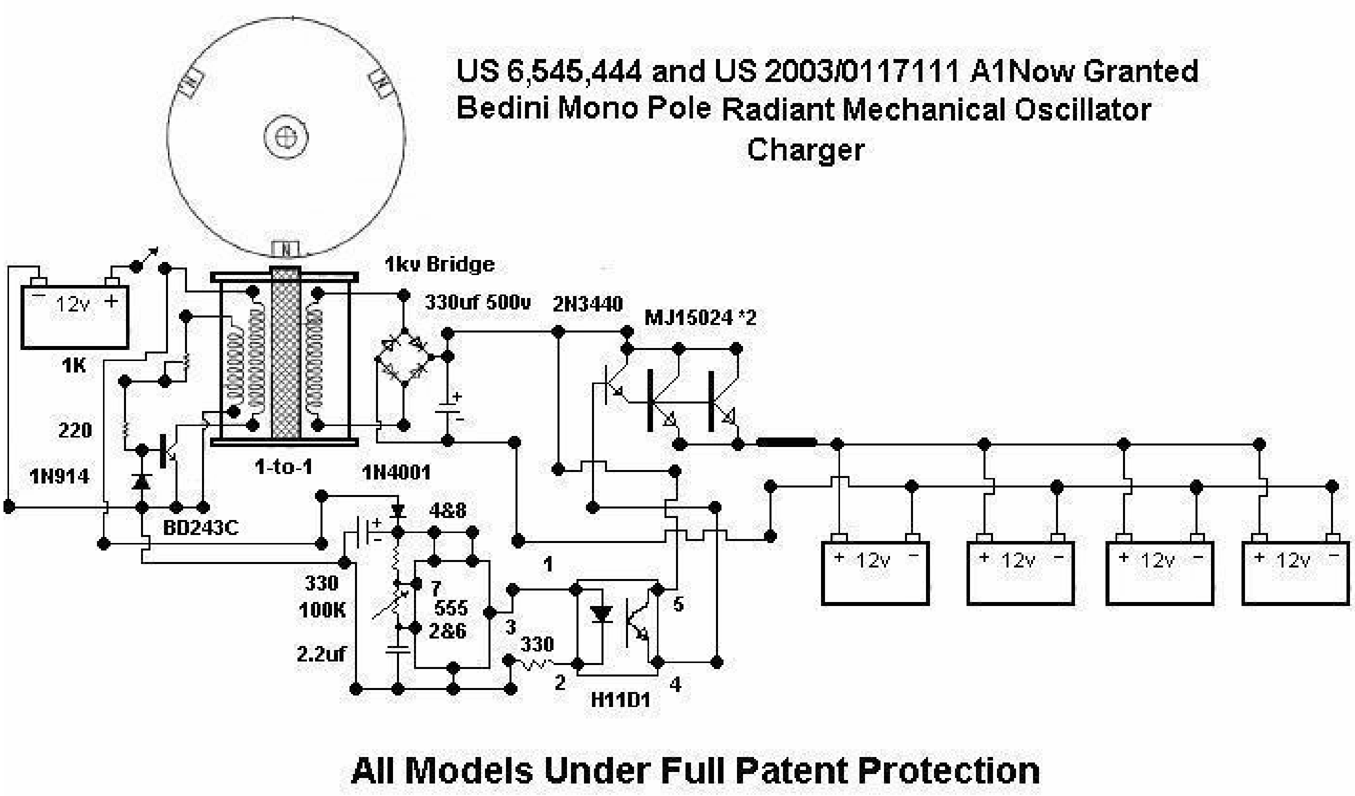

Figure 4: Patented model illustrating the one to four capability of the Bedini energizers

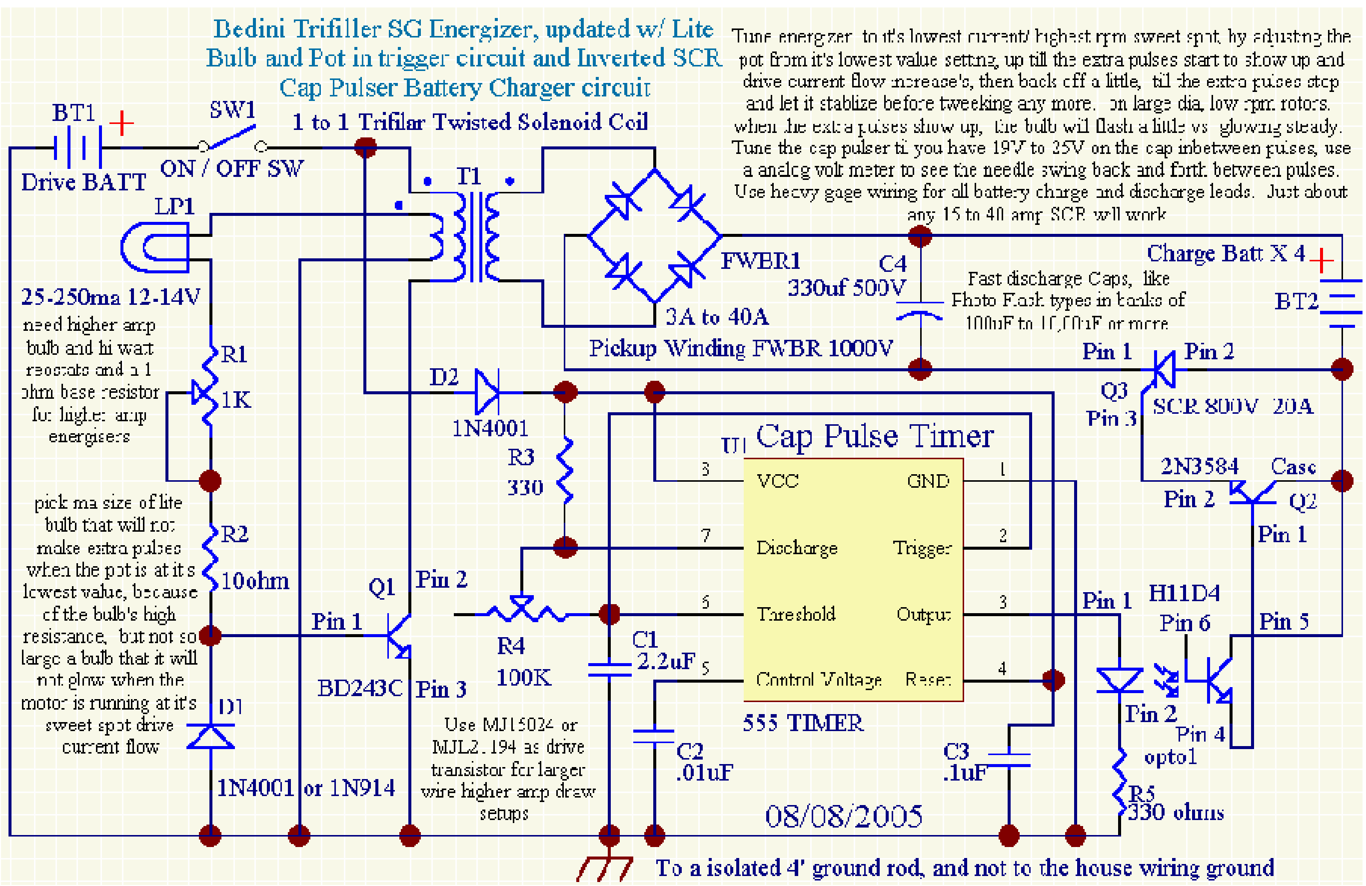

Figure 5: Updated Bedini Trifilar Energizer