

# ScanTesla

V-7.40

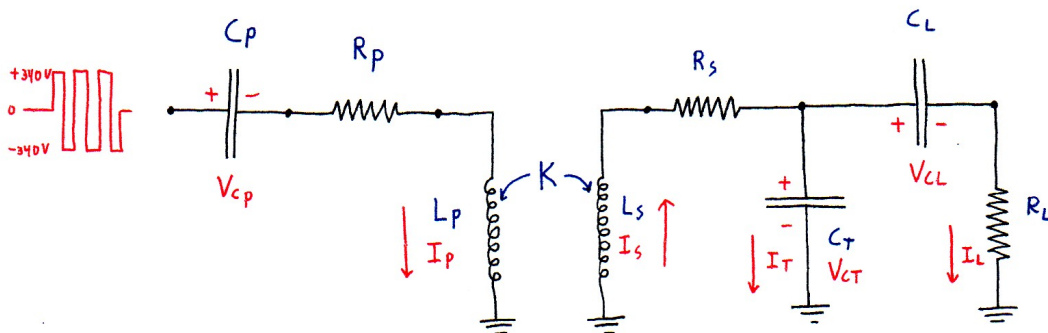
A program to scan Tesla coil parameters to find the best output.

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ScanTesla is a program that iterates through and tests a large number of Tesla coil parameters in search of those parameters that give the best output sparks.

The program is intended for the new DRSSTC type of Tesla coil, but the inputs can easily be set for typical disruptive coils to be studied too.

The Tesla coil is assumed to match the following model:



This is a standard Tesla coil model with a DRSSTC style input. Various equations are given which define how the circuit elements are applied in the program.  $C_L$  and  $R_L$  are the typical 1pF/foot +220k Ohm streamer load elements (these may improve over time). In the case of a conventional coil, the input is set to zero and node1 is set to the initial  $C_p$  voltage. With a very long T1 time, CW coils could be directly modeled as well.

The program is run from the file "input.txt" which has all the run parameters in it. The parameters are as follows:

Cp start, stop, and increment  
Rp start, stop, and increment  
Lp start, stop, and increment - If inc < 0 then auto tuning is used.  
Ls start, stop, and increment  
K start, stop, and increment  
Rs start, stop, and increment  
Ct start, stop, and increment  
Cl start, stop, and increment - If inc < 0 then automatic loading.  
Rl start, stop, and increment  
T1 start, stop, and increment - If inc < 0 then automatic timing.  
Vin DRSSTC square wave voltage or 0.0 for conventional coil.  
Vn1 initial firing voltage on Cprimary for disruptive coil case.  
BPS Coil Breaks per Second.  
Dwell start, stop, and increment - DRSSTC dwell time - Not used for conventional coils.  
Current limit for DRSSTC - Set high for conventional coils.  
Coil power limit in watts.  
Goal type  
    0 = Find maximum secondary voltage.  
    1 = Find maximum streamer power.  
    3 = Output all data

The program will scan the values as defined above. Normally, most of the variables will be fixed and only a few actually scanned.

The program outputs on screen data and will generate a number of files:

outputdata.csv - All of the input and output data for the significant models.

output.txt - A text file recording the significant model screen data. The best is the last one.

waveforms.csv - Real time data for the single best model. Good for making waveform graphs and doing calculations.

These files can be opened in spreadsheet programs, math programs or text programs to be used in many ways.

The program will be written in C with LCC (<http://www.cs.virginia.edu/~lcc-win32/>). The following rules will apply:

1. It will be very easy to modify and recompile so anyone can add improvements or special functions over time as they wish and as the art improves.
2. No special libraries or complex programming will be used to keep it simple, understandable, and versatile.
3. The program should be general enough to be compiled with just about any C compiler under any operating system.
4. To keep it simple and easy, No GUI is supported. Input and output is typically done through direct input/output or data files to be analyzed with say spreadsheet programs.
5. There will be no copyright, GPL, copyleft, trademarks, or real owner for the Public Domain base version. Anyone can copy, steal, plagiarize, change, or use it as they wish. People may want to sell, copyright or do whatever with improved versions (say with an added GUI) but that is their problem, not ours.