SISG4 PCB Assembly Notes

1. The PC board has (4) SISG circuits thus the designation SISG4. Each circuit has threshold voltage of 900 volts. Board has threshold voltage of 3600 volts. Taps are located between each circuit so that threshold multiples of 900 volt may be selected. The taps are designed to accommodate #14 ga HV wire soldered thru a hole to the board.
2. The Bill of Material for the board is in file SISG4BOM.pdf.
3. Board has mounting holes located in each of (4) corners. Holes are designed to accommodate a #6 nylon pan head screw with #6 nylon stand-offs underneath.
4. There are a number of bi-directional components on the board. Specifically the:Sidacs(U1, U2, U3, U*x*1, U*x*2, U*x*3, where *x*=1,2,3), the TVS(D1, D*x*1, D3, D*x*3, where *x* = 1,2,3), and the resistors and Caps. The Sidac orientation on the board was chosen to optimize layout. The other bi-directional parts are symmetric.
5. Please note that a resistor (R4, R*x*4 where *x* =1,2,3) passes over a high voltage trace and thus should be elevated from the board. In the original design, this was 100 ohm resistor. I am still using the 100 ohm resistor(as of Nov 2006). Terry is now using a 50 ohm resistor. The new resistor turns on the IGBT faster and reduces the current load on the Sidacs.
6. Resistor R5 (R5, Rx5 where *x* =1,2,3) value will vary with different coils. I am now using 680 ohm(Nov 2006). The value of this resistor sets the IGBT "on" time. We may need to consult with Terry Fritz on the value for this resistor for a given application.
7. The board is designed for Capacitor ECW-F2104JS with .500"(12.5mm) lead spacing. This is the ROHS compliant part, but is currently not available(ROHS kicks in July 2006). Supposedly it will replace the non-compliant ROHS part ECW-F2104JB with .600"(15 mm) lead spacing currently available from Digikey. The Panasonic data sheets have already been revise to show the "JS", but the distributors have not run out of the "JB" so that is why "JS" is not yet available(according to Panasonic after some arm twisting). Why they changed the lead spacing I do not know. Anyway, I had to bend the leads on the "JB" slightly to make it fit. Not a big deal.
8. There are two methods to handle the IGBT heat sink. The first uses clips held in place by a #6-32 screw. There is a drawing and pictures for this. It requires drilling a hole in the heat sink 1-5/16" above the bottom surface of the heat sink. You may tap the heat sink #6-32(use 7/64" tap drill) or drill it thru 5/32 and use a nut to hold the screw in place. Be sure to use thermal grease. Alternatively, the Artic Seal adhesive can be used. Be careful to mask off the pins as the product is conductive at our voltages.
9. I apologize about the unconventional labeling of the parts. I used a new piece of free-ware to design the board(it produces gerber files directly) and it did not allow me to change the component designations after the traces were completed. The BOM has a complete list of the designations. "*x*" represents a variable within the label(*x* = 1,2, or 3) Note that Terry's schematic uses different designations.
10. The power supply that feeds the board must be rectified. The Sidacs will not fire the circuit unless they are fed a positive voltage. The board is marked "+" at TB1 and "-" at TB2. Also, the power must NOT be filtered. If the board is driven with pure DC then the IGBT's will never shut down.
11. The IGBT's are rated for 800 amps so be sure to calculate the current flow in your primary circuit.
12. For documentation see http://www.teslaboys.com/SISG

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File:SISG4PCBAssyNotes.doc
6/2/06
Revised 6/6/06
Revised 6/15/06
Revised 7/6/06
Revised 11/7/06