**SCOPE OF WORK:**

This re-spin represents the Prototype run 3 for the Power Factor Correction circuit of the electrosurgical generator project, T800. The learnings from Prototype run 3 shall be taken as inputs for the PCB redesign. This design will undergo peer review in order to improve design.

**PERIOD OF PERFORMANCE:**

All work must be scheduled to complete within this timeframe. The period of performance will start from the day when:

**PLACE OF PERFORMANCE:**

The design changes shall be made within the USMI R&D facility. The prototype vendor, which is currently Smart Prototyping (http://www.smart-prototyping.com/) will produce the prototpyes in Qtys of atleast 5 boards per job output. The production will take place as per specifications provided in the gerber files.

**Major Changes:**

In this prototype we shall introduce a slightly different technique for managing the inrush current peak that is generated at start-up. This peak can be much higher in magnitude than the current in steady state operation and thus, most components are not spec’d out for it. In the existing design of the PFC module of the T800 generator, we are using a NTC resistor, which is the conventional approach taken by most power supply designers. However, there are several drawbacks associated with this technique would make us want to take a different approach in order to deal with this current limiting issue.

***Drawback 1:*** *The methodology itself will requires the NTC resistor to have a higher thermal footprint during normal operating conditions, this could add stress to the surrounding semiconductor based components.*

***Drawback 2:*** *The time response of the NTC resistors in certain scenarios may not be fast enough. For example: In a line drop out or brownout situation when the current is still flowing through the NTC resistor due to the discharge from the bulk capacitors. The NTC is not cold enough to resist the inrush surge spike that will be produced when the line recovers.*

**PCB DESIGN CONSTRAINTS:**

**Phase I List of Changes, New concept implementation**

1. Getting rid of the NTC resistor
2. Introduce Hall Effect current sensor appropriately within the circuit.
3. Introduce Inrush current limiting within the circuit.
4. Adding an isolator after my 12V before using it.
5. Change the heat sink
6. Pay attention to the Gate orientation when placing it. Make sure the front is facing the outside and not the heatsink.
7. Place the gate driver circuit and the controller on the same side.

**Phase 2: List of Changes, Post Peer Review (Reviewer: Dr. Taisen Zhuang)**