JACKET USING THERMOELECTRIC EFFECT TO WIRELESSLY CHARGE DEVICE

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Abstract

The purpose of this design prototype was to produce energy to power a wireless cell phone charger using the Peltier effect. Essentially, the Peltier tiles absorb energy from the temperature difference between body heat and the outside environment to produce current and voltage. To maximize the efficiency, the tiles would be utilized in the cold winter in order to generate a high temperature difference between both sides of the tiles to produce higher current and voltage. Then, the DC voltage was converted into an AC waveform using an oscillator circuit. Several oscillator circuit designs were created but the 555CN oscillator yielded the most consistent results. The oscillator circuit output a square wave signal. Therefore, a band-pass filter was implemented to create a waveform closer to a sine wave. The resulting waveform was a triangular waveform, which could still be properly utilized in the circuitry. After the oscillation circuit, a current bypass circuit had to be implemented to increase the current for use in the rest of the prototype. After the requirements had been met for the oscillation portion of the design, the AC signal was transferred into a rectifier circuit using electromagnetic induction between two copper wire coils. The coils were designed to minimize losses if the phone and prototype were placed inside of a jacket pocket. The rectifier circuit re-converted the AC signal back into DC voltage and current, which was used to charge the cell phone. In order to maintain a consistent voltage, a voltage regulator needed to be implemented to ensure a constant 5V input into the phone and thus, preventing circuit overload.

Key Words: Peltier effect, oscillator, rectifier, electromagnetic induction, voltage regulator