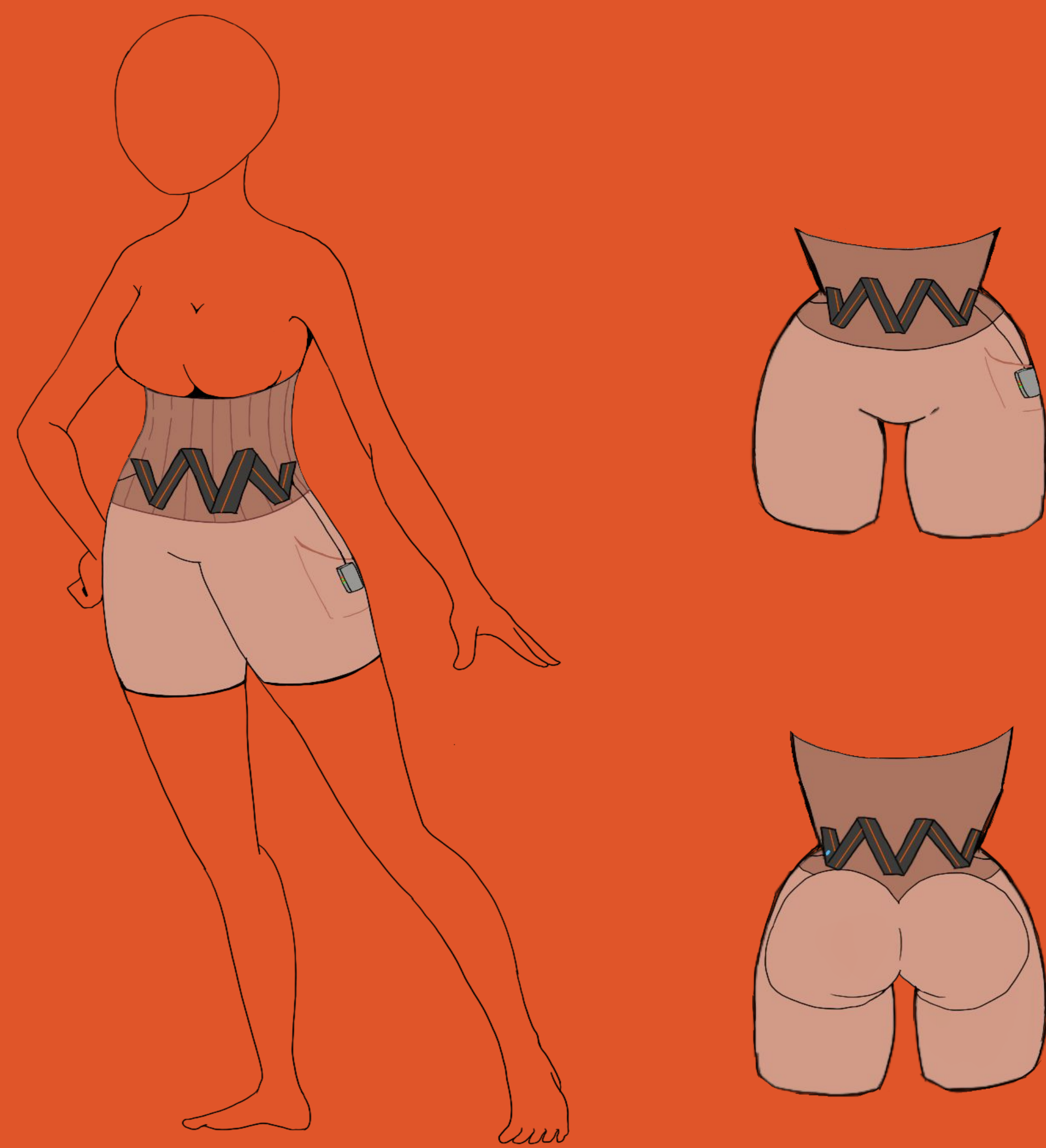


Thermotherapy

- Heat minimizes pain by relaxing muscles and expanding blood vessels to increase blood flow in a specific area to make pain go away.

Specifications

- Material consists of two layers of fabric for **maximum heat generation** combined with compression.
- **10x more heating** on targeted areas such as the abdominal, lower back, and obliques.
- **3 heat settings** controlled by user through mobile app with Bluetooth.
- **3 hour battery life** from 7.4 V battery.
- **Light compressible shapewear** with heating element sandwiched between layers of fabric for comfortability.
- **Machine washable** with the circuit and battery enclosed in removable protective case.



MEGA CRAMPBLASTER 3000

Jennelle Andersen, Dominique Gramm, Travis Hinz, Sierra Sotela, Clare Jayawickrama

The Problem

30% of menstruating women (25 million American women) take sick days from work and school, or miss important social events due to painful periods. The most common reasons for missing normal daily activities are abdominal and uterine cramps, and back pain.

Our Solution

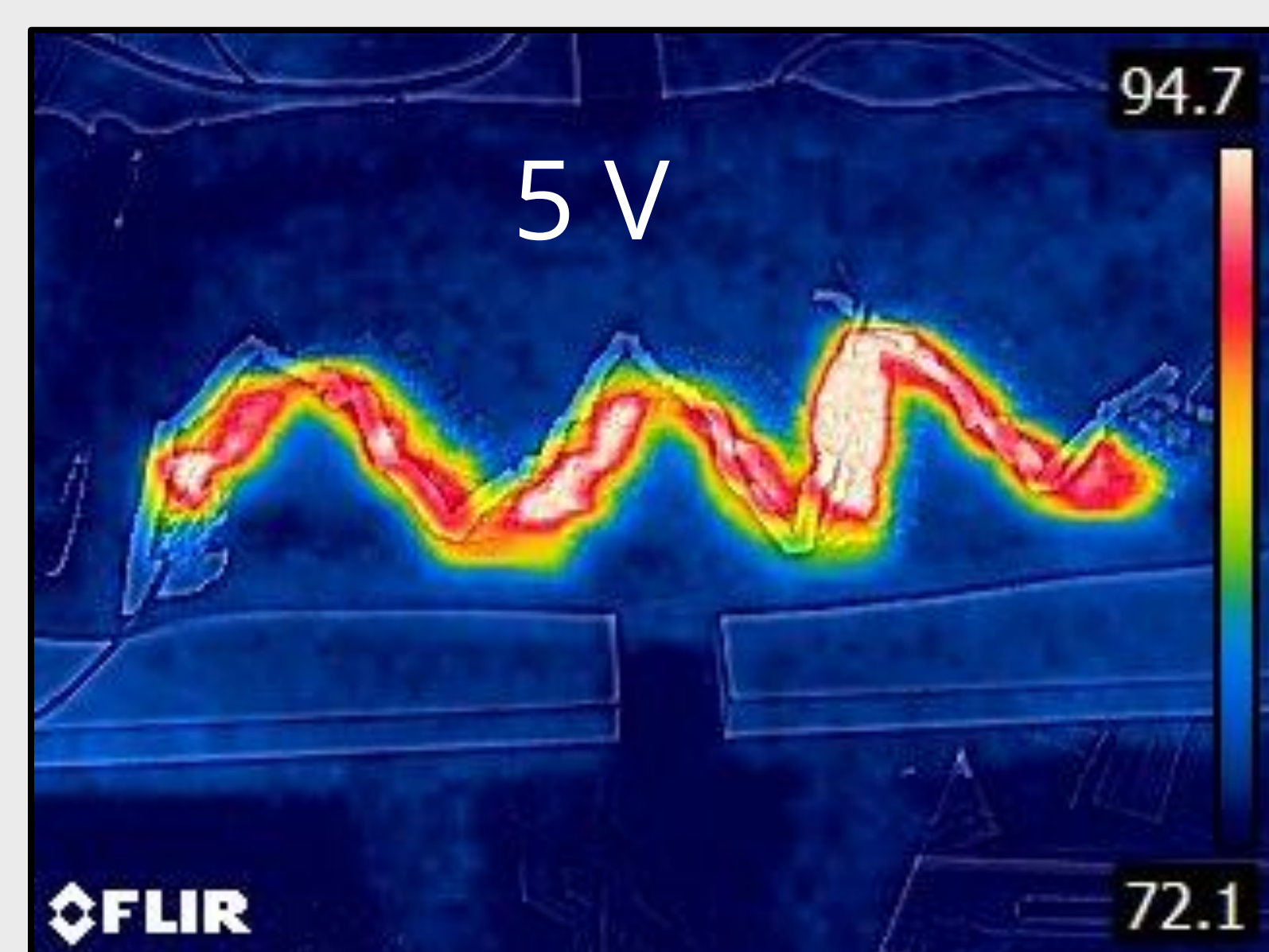
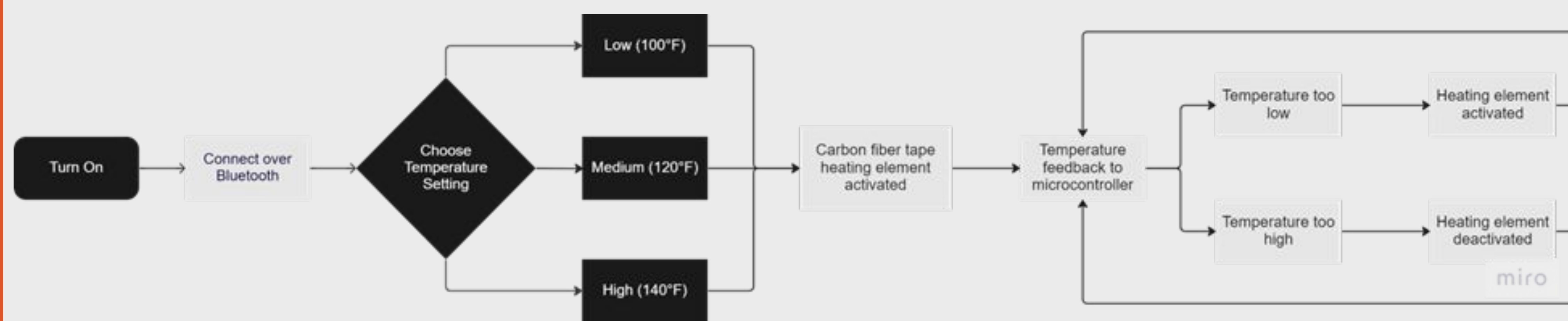
The Mega CrampBlaster 3000 provides a **discrete** way to deliver **mobile, targeted, user-controlled heat** for hours at a time. It contains carbon fiber heat conducting tape that provides targeted thermotherapy to sections surrounding the torso region.

This product can be **controlled wirelessly via a Bluetooth app** that can be accessed from a mobile device. From the app, the user can regulate the temperature by switching between the multiple heat settings: low, medium, and high, with temperatures reaching up to 125 degrees Fahrenheit

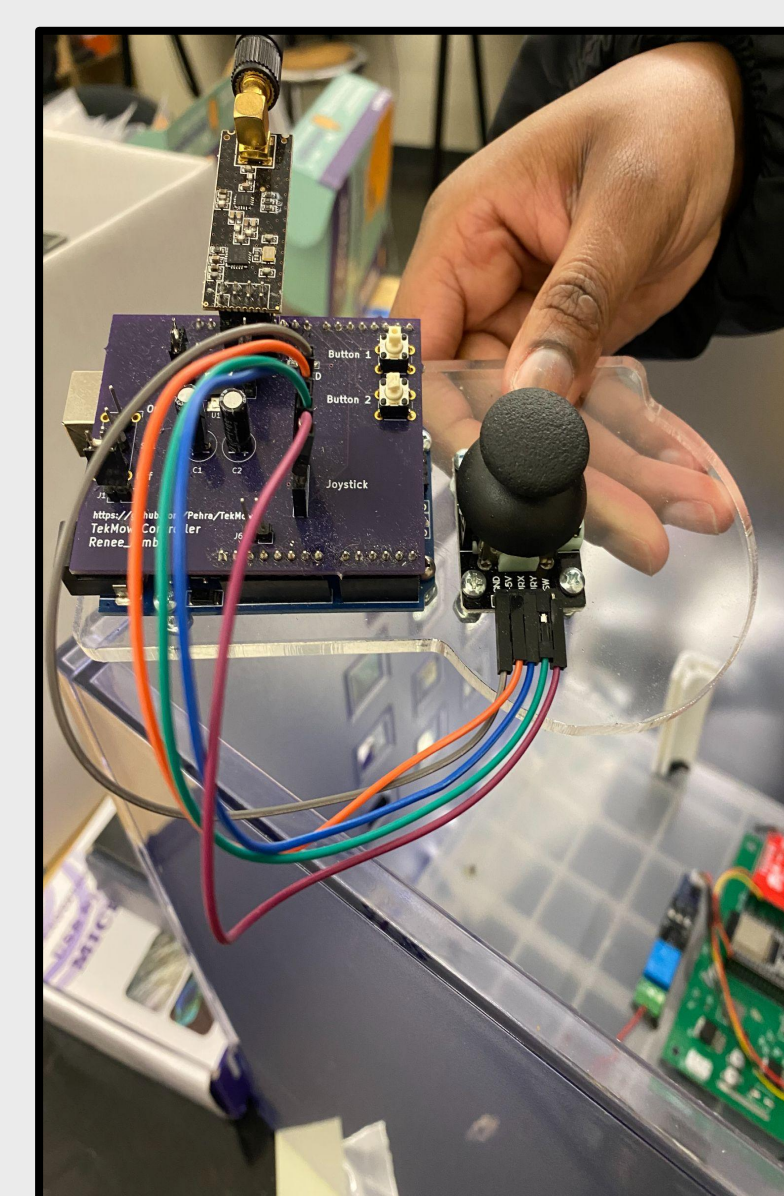
It is completely **battery operated** and **rechargeable**, with a battery life capable of lasting 3 hours on a single charge and is **machine-washable**.

The Mega CrampBlaster 3000 is a convenient and durable way to provide a constant source of heat to the body, increasing blood flow for therapeutic pain relief, all while enabling women to fulfill their responsibilities confidently during PMS and menstrual symptoms.

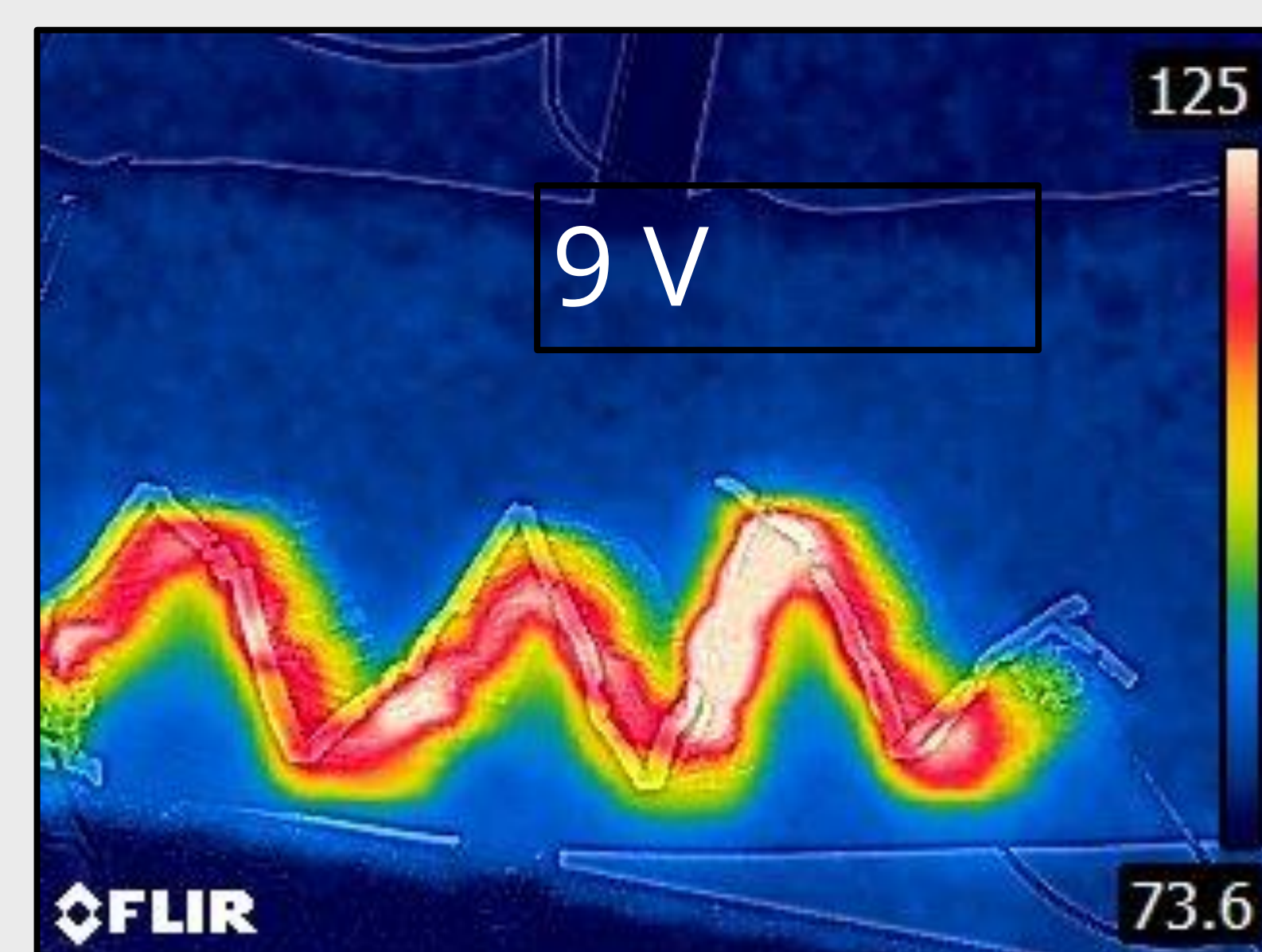
Product Use Flowchart: Black indicates user input and gray indicates code control



The maximum temperature reached with 5V battery was 95 degrees Fahrenheit.



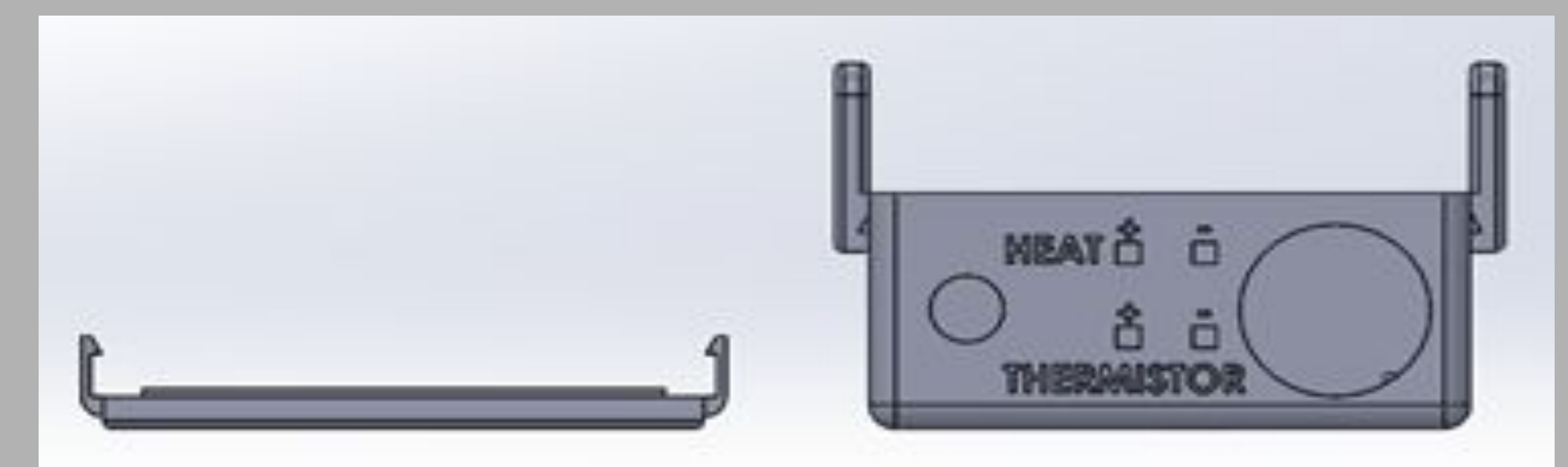
Testing the circuit for heating element



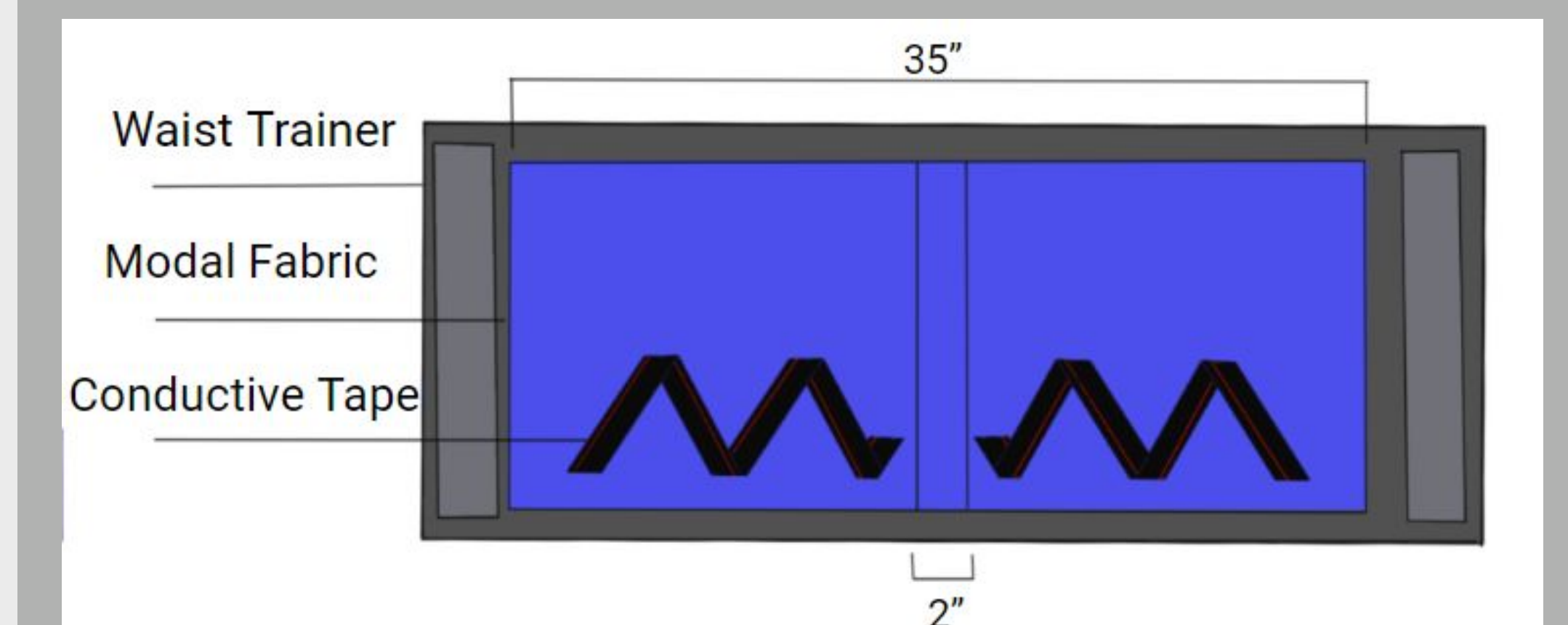
The maximum temperature reached with 9V battery was 125 degrees Fahrenheit.

Engineering

- Heating element within the product is made of **conductive carbon fiber fabric**, which undergoes resistive heating
- Resistive heating: voltage passing through resistance causes energy loss in the form of heat
- Product controlled by a **built-in microcontroller** programmed through **Arduino IDE**.
- Temperature maintained at levels chosen by the user utilizing an **'if' statement** within Arduino code.
- **Safety shut off** is coded within program.
- **Heat transfer calculations** were modeled and verified for achieving desired and comfortable heating.
- Materials sewn together to achieve a comfortable garment that covers 10x more area of heating.



Protective case designed on SolidWorks



Dimensions of fabric

