PEMF Medical Research Device

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SnaCoil
Lie down, Heal up

Background

Pulsed electromagnetic field therapy, or PEMF, is a medical therapy that has the potential to treat a variety of conditions, such as muscle soreness, joint pain, and even osteoarthritis. It works by inducing currents in tissue through alternating magnetic waves, similar to those created in traditional physical therapy, without actually moving the body. SnaCoil is a device that brings extreme configurability, intensity, and affordability to both users and researchers in this field

Overview

SnaCoil is a foam covered mat with eight coils inside that each produce pulsed electromagnetic waves. The user simply plugs in the device, lies on the mat and lets the PEMF therapy do the rest.

- Variable waveforms are available, along with configurable strength and frequency
- Researchers can connect to the controls box and tune parameters exactly to their liking
- Significantly cheaper and more powerful then alternative products on the market
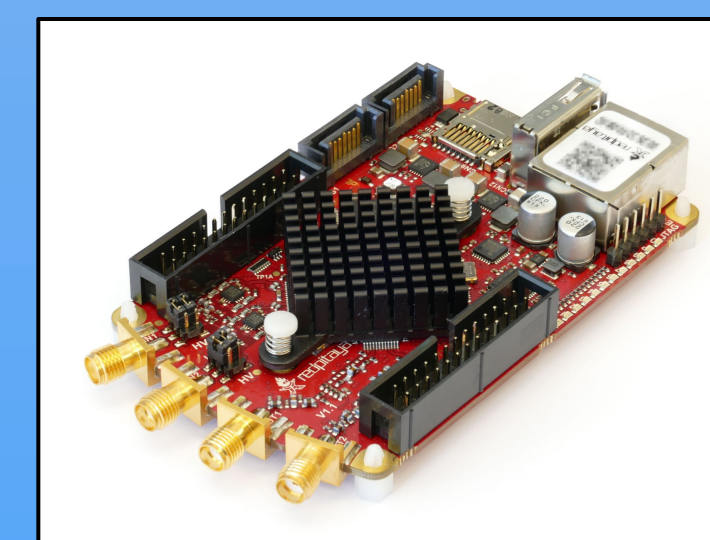
Demonstrated Use
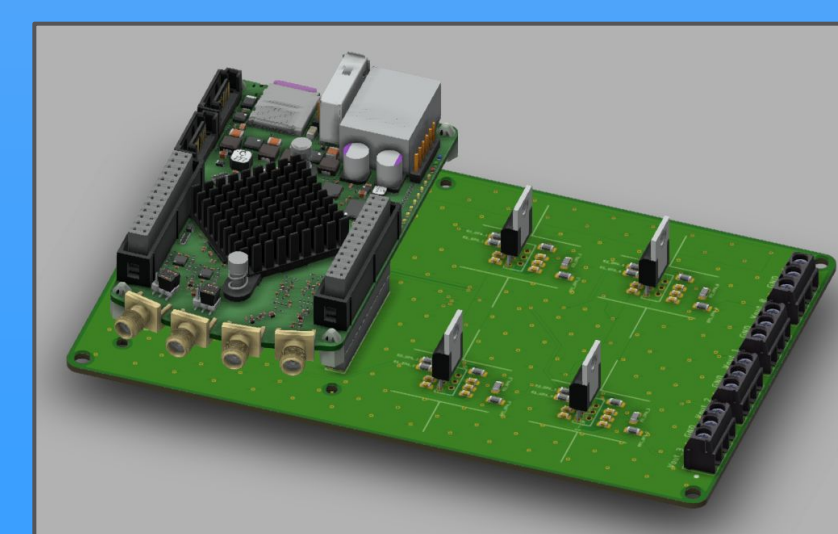

Hardware Configuration
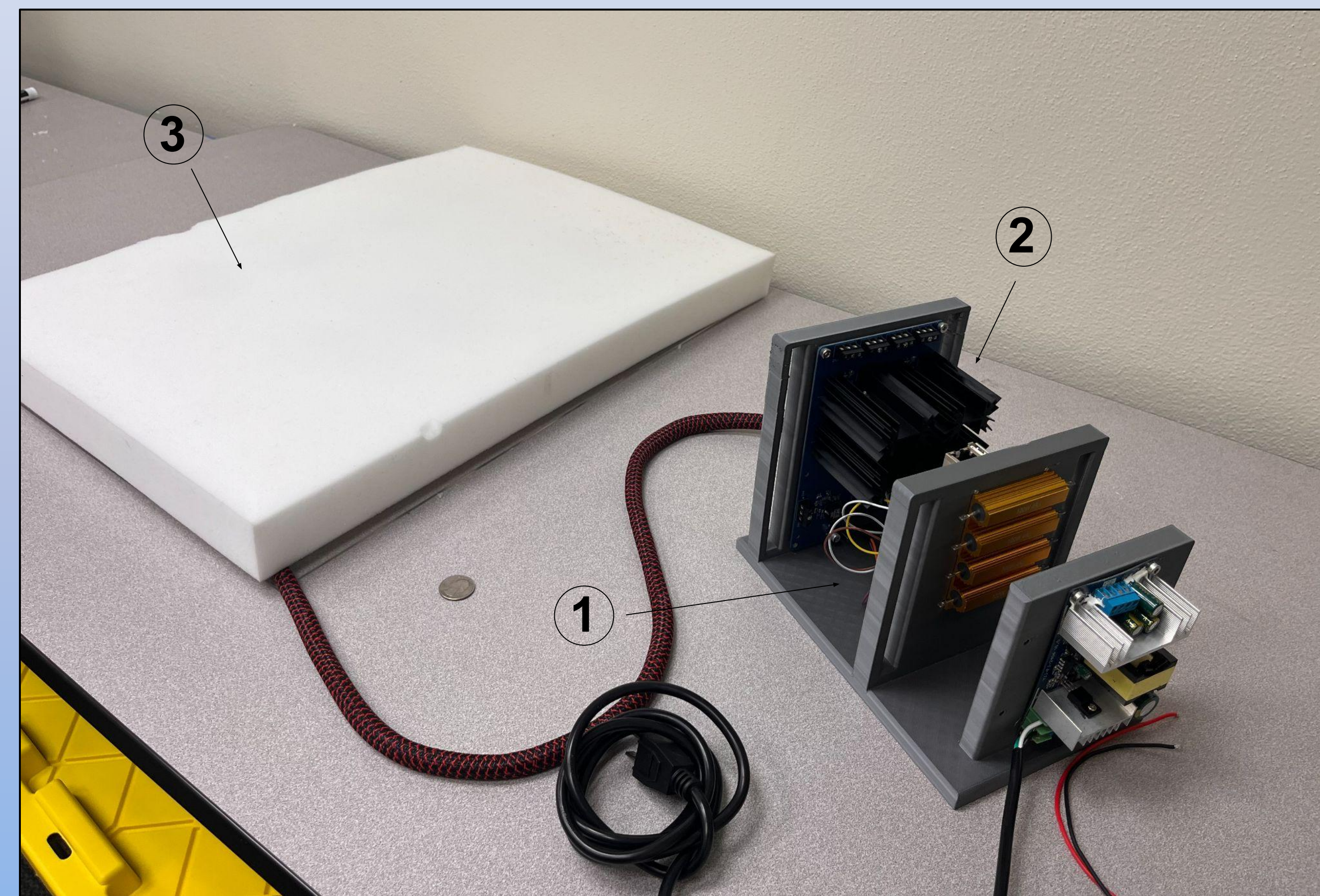
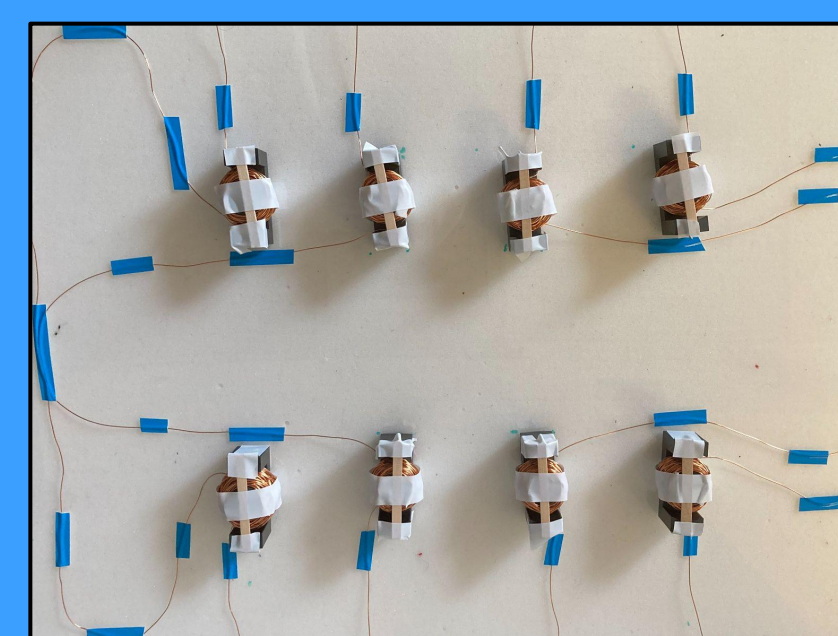Mat with coils underneath connected to controls box

Key Components

1- Signal Generator (Red Pitaya)
- 4 Analog Output Channels 12bits
- I2C, SPI, UART Communication Interfaces
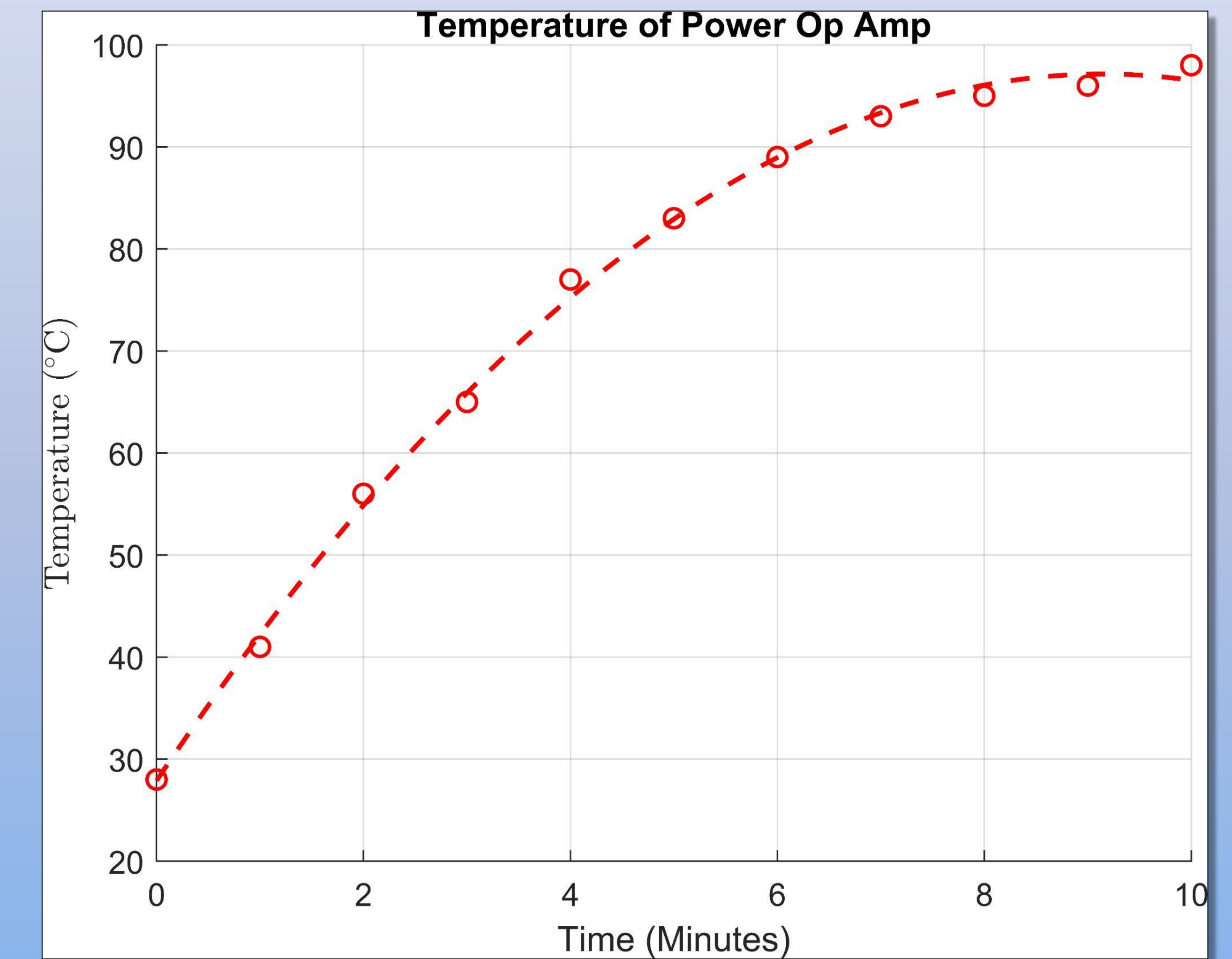- 4 GB of RAM
- Xilinx Zynq 7010 FPGA

2- Custom Electronics
- Transformer/rectifier120Vac->24Vdc
- Buck Converter 24V -> 5V
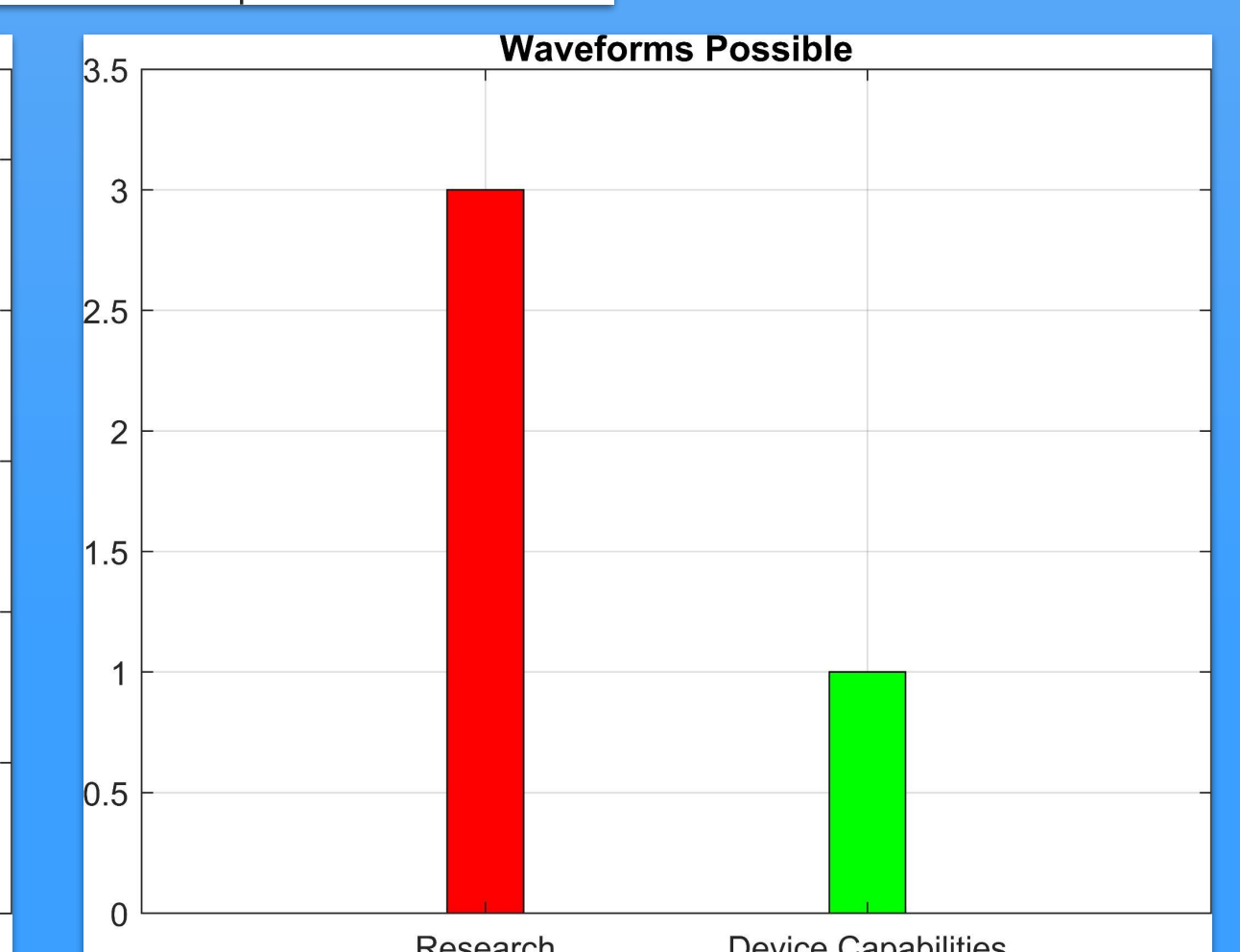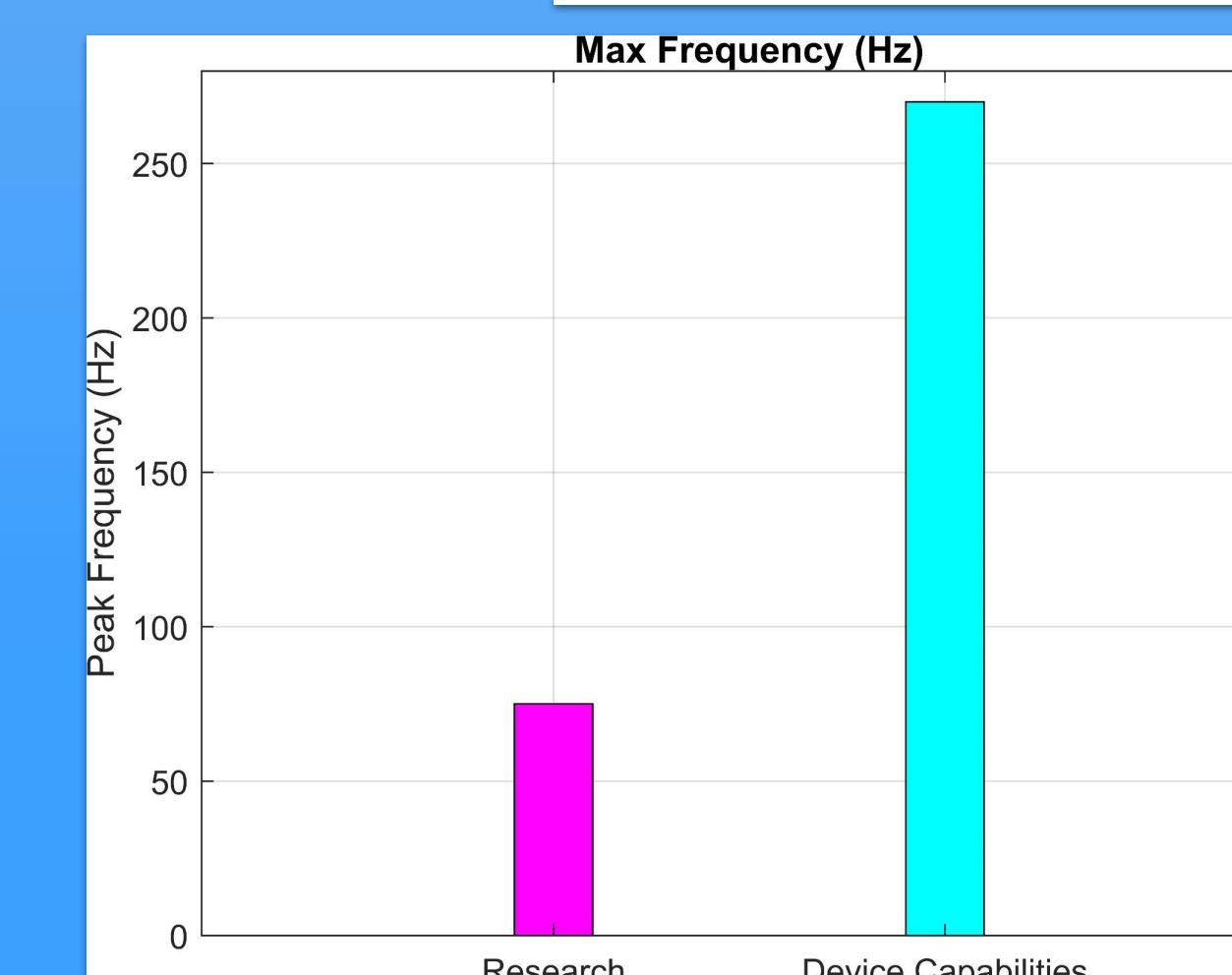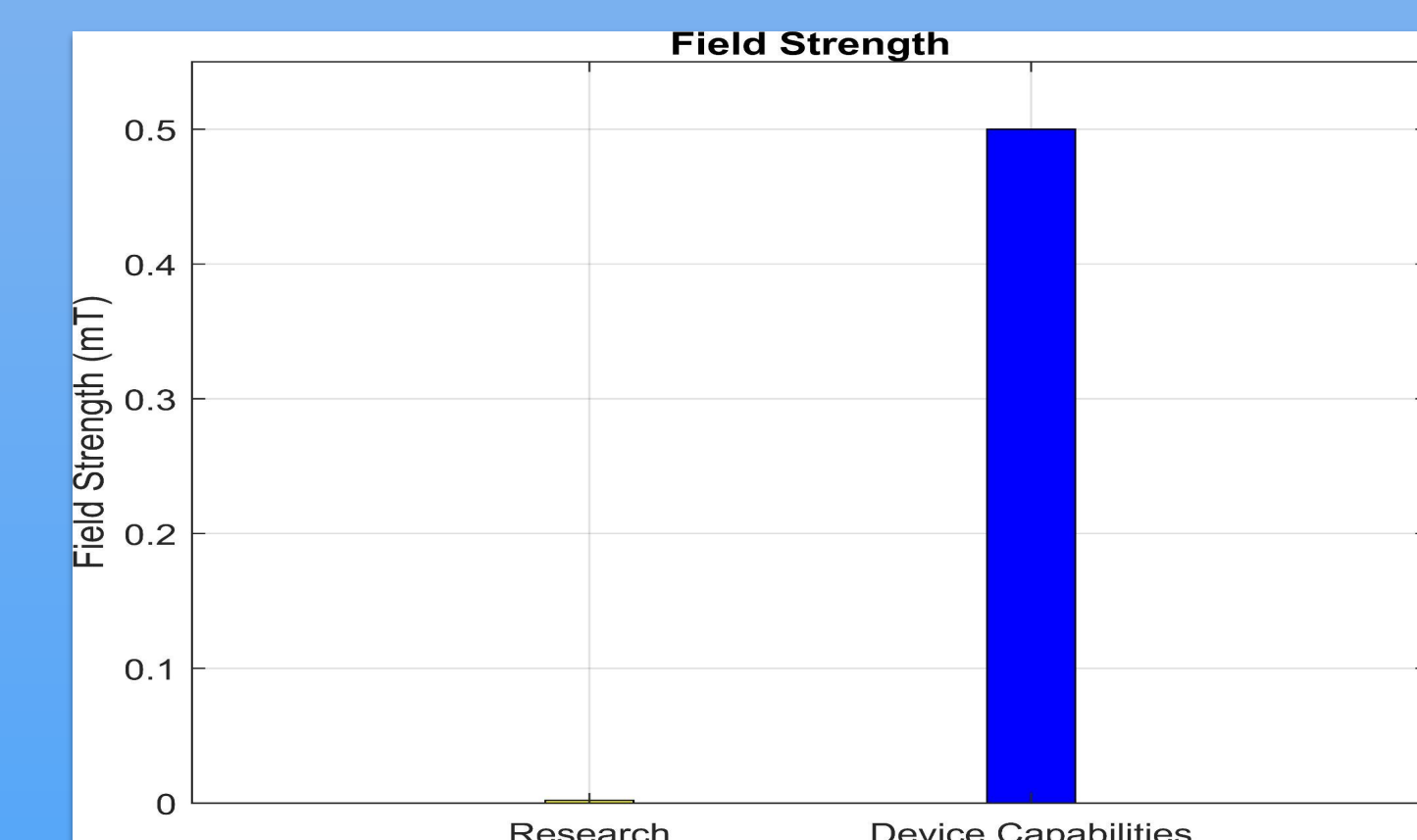- Pre-Amplifier: 0-1V -> 0-20V
- Power Op Amps: 1-2A

3- Coils and Mat
- Hand-wound coils to keep form factor
- Wrapped around a ferrite magnetic core to maximize field strength with minimal current and size
- Covered in foam for user comfort

Thermal Testing

Waveform Testing

- Produces three waveforms, sawtooth, sine, and square, as opposed to all competitors using square waves
- Field strengths up to 2500 times stronger than minimum beneficial field strength
- Frequency range more than three times maximum found in research

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