

Moxy Brief Operational Description

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Moxy uses near infrared spectroscopy to measure muscle oxygen levels in the muscles of athletes while they exercise. The light emitter is 4 LEDs operating at wavelengths near 680, 720, 760, and 800 nm. There are two photodiode detectors at different distances from the emitter that detect light after it has been scattered through tissue.

Moxy calculates the Muscle Oxygen Saturation and the Total Hemoglobin Concentration every 2 seconds. This data is stored on the sensor and it is transmitted out using the ANT+ wireless protocol. The data can be received by various ANT+ devices such as wristwatches, bike computers, personal computers, or smart phones.

Moxy has a USB port for charging its battery and for downloading stored data after a workout.

Moxy is controlled by a Nordic nRF51422 system-on-a-chip microcontroller. This controller has an ARM controller and an ANT+ radio built in. The nRF51422 is driven by two different crystal oscillators. A 16 MHz crystal oscillator is used during normal operation. A 32.768 kHz oscillator is used to keep the real time clock operational on the microcontroller when all of its other functions are put to sleep in a power off mode.

The microcontroller communicates over an SPI interface with a Burr Brown DDC114 Analog to digital converter that reads the signals in from the photodiodes. The microcontroller also supplies a 4 MHz clock signal for the A/D converter.

The microcontroller is connected to a chip antenna to broadcast data.