Technical Description: FredMeyer Camping Headlamp

The FredMeyer headlamp is a pocket sized light source made for wearing around a user's head during situations when visibility could be aided by a supplementary light source.

The headlamp is made up of two physical parts: a black lamp containing 6 LEDs (Light Emitting Diodes), and a black elastic variable-length strap. The lamp has three settings allowing for light of different color to be emitted from the LEDs. This paper describes the lamp, strap, and power settings.

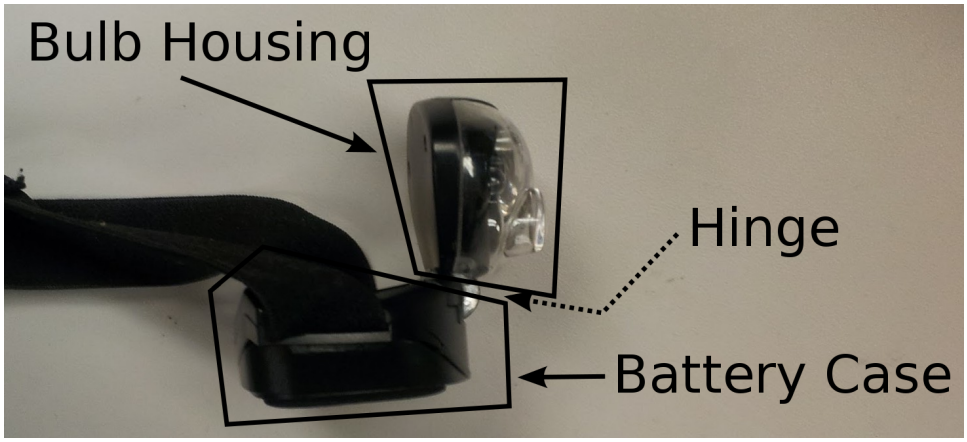
Height	Width	Depth
3.5 cm	5 cm	3.5 cm

Table 1: Lamp Dimensions. See Figure 3 for spacial orientation.

The Lamp

The lamp preforms the primary function of the headlamp. It is 1/4 pounds when loaded with it's 3 AAA-battery power source. The lamp itself is split into two modules: the bulb housing and the battery case. The two modules are joined by a hinge which allows the LEDs to be aimed variably (see Figure 1).

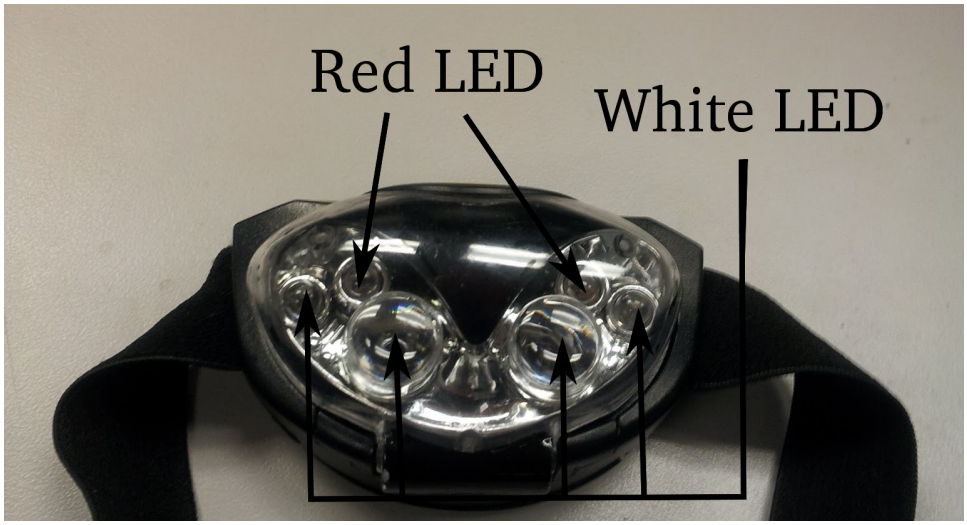
Figure 1: Side view of the headlamp.



Bulb Housing

The bulb housing module holds the LEDs, LED casing, and power switch.

Figure 2: Front view of the headlamp.



LEDs

The lamp has 6 main LEDs, 4 of the LEDs are white and the other 2 are red. Of the 4 white LED's 2 of them have a radius of 0.5 cm and are located symmetrically opposite of each other located 1 cm away from the front center line of the lamp. The remaining 4 LEDs have a radius of 0.25 cm and are aligned symmetrically opposite to each other and are lined up starting 2 cm away from the front center line of the lamp. With regard to the 4 0.5 cm LEDs, the two furthest from the center line are white, the inner pair are red (see Figure 2).

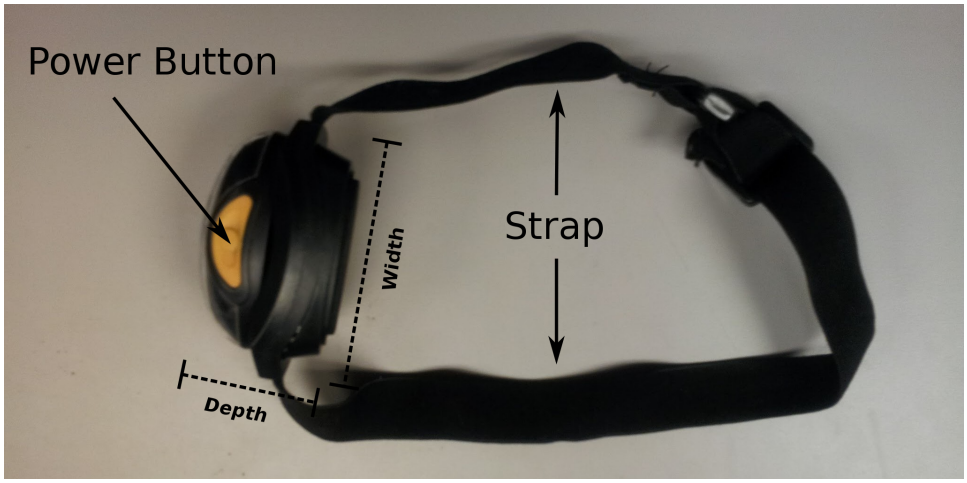
LED Casing

To protect the LEDs, a clear form fitting case covers the front of the lamp. The case also acts to focus and intensify the light from the LEDs. The case consists of hard plastic and is roughly 3 mm thick.

Power button

Turning on the lamp and cycling through the lamp's power settings is done with the plastic yellow power button located on the top of the lamp (see Figure 3). The button is pressure sensitive.

Figure 3: Top view of the headlamp



Battery Case

The battery case is rectangular with rounded edges (see Figure 1). It is 5 cm across, 3.5 cm wide, and 1.5 cm deep. When in use, the back of the case is placed onto the users' forehead. To make this more comfortable there is a soft black pad on the back 5 cm by 3.5 cm panel.

The Strap

The strap holds the headlamp to the users' head. The elastic variable-length strap is at maximum 2 ft long, and at minimum 1/2 ft long (see Figure 3).

LED settings

Pressing the power button will cycle the LEDs through three different modes: Normal-White, Bright-White, and Flashing-Red (see Table 2). These settings are achieved by powering some LEDs while not powering others.

Normal-White

From the off state, pressing the button once will place the headlamp into the Normal-White state. This setting drives power to the two main 0.5 cm-radius-LEDs.

Bright-White

From the off state, pressing the button twice will place the headlamp into the Bright-White state. This setting drives power to both the two main 0.5 cm-radius-LEDs and the two outer white 0.25 cm-radius-LEDs. The headlamp emits the most light while in this state.

Flashing-Red

From the off state, pressing the button three times will place the headlamp into the Flashing-Red state. This setting drives power to the two inner 0.5 cm-radius-LEDs. While in this state the LEDs will flash on and off at a frequency of 3 times per second. Each flash has a duration of 0.25 seconds.

State	State Offset	# of Powered LEDs	Description
Normal White	1	2	Basic setting. Two main LEDs are powered. Most appropriate for use over long durations of time.
Bright White	2	4	Brightest setting. Two main LEDs and two white auxilary LEDs powered. Most appropriate setting when a very bright light is needed.
Flashing Red	3	4	Highest contrast setting. Two red auxilary LEDs flash.

Table 2: Headlamp states. State Offset refers to the offset (number of power states) from the 'off' state.