Calculating Battery Life for the Lock

Micro-Motor:

- Micro-motor runs 50 milliseconds (1/20 second) and consumes 150mA (at worst) at a time.
- It runs 2 times in single user mode (with automatically closing feature), 4 times in multiple user (locker) mode.
- The motor runs total 100 milliseconds (2 x 50 = 100ms) in every cycle in Single Mode, and 200 milliseconds (4 x 50 = 200ms) in Locker Mode.
- If daily usage cycle is 10, so,
  - In single user mode, the motor runs (10 x 100ms = 1000ms) 1 second, means 1/3600 = 0.000278 hours, in a day.
  - In Locker Mode, the motor runs (10 x 200ms = 2000ms) 2 second, seconds means 2/3600 = 0.000556 hours, in a day
- Finally, the motor consumes;
  - In single user mode, 150mA x 0.000278 = **0,0417mAh** in a day.
  - In Locker mode, 150mA x 0.000556h = **0,0834mAh** in a day.

Buzzer & Leds:

- Buzzer and leds operate 25 milliseconds and consume approx. 10mA at a time.
- The keys are pressed 8 times and the lock gives warning 4 times, totally buzzer and leds operate 12 times in a cycle (12 x 25 = 300ms).
- They operate 10 x 300 = 3000 millisecond in a day (3 / 3600 = 0.000833 hours in a day)
- Finally, the buzzer and leds consume 10mA x 0.000833h = **0.00833mAh** in a day.

Sleep Mode and Others:

- The lock consumes 1 microA (uA) at worst in sleep mode*. So, 0.001 x 24 = **0.024mAh** in a day
  (*) Actually sleep mode current is approx. between 550 and 650 nanoampere (0.55uA – 0.65uA)
- The lock consumes 1mA during operation and one operation (opening or closing the lock) takes approx. 10 seconds, thus, it consumes (1mA x 10s x 10) / 3600) = **0.0278mAh** in a day.
- Overall power consume is:
  - In Single user mode, **0.0417 + 0.00833 + 0.024 + 0,0278 = 0.102mAh** in a day.
  - In Locker mode, **0.0834 + 0.00833 + 0.024 + 0,0278 = 0.144mAh** in a day.

Conclusion:

- Typical capacity of CR2450 is 600mAh. Loosing capacity of the battery is 1% per year. So, the average capacity is 550mAh.
  - In Single User Mode, 550 / 0.102 = **5,392** days, it means **14.8 years**
  - In Locker mode, 550 / 0.144 = **3,819** days, it means **10.5 years**

If the locking mode is Single User;
options are set automatically closing and buzzer off;
using high capacity batteries;
the battery life is much more than calculation above.

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