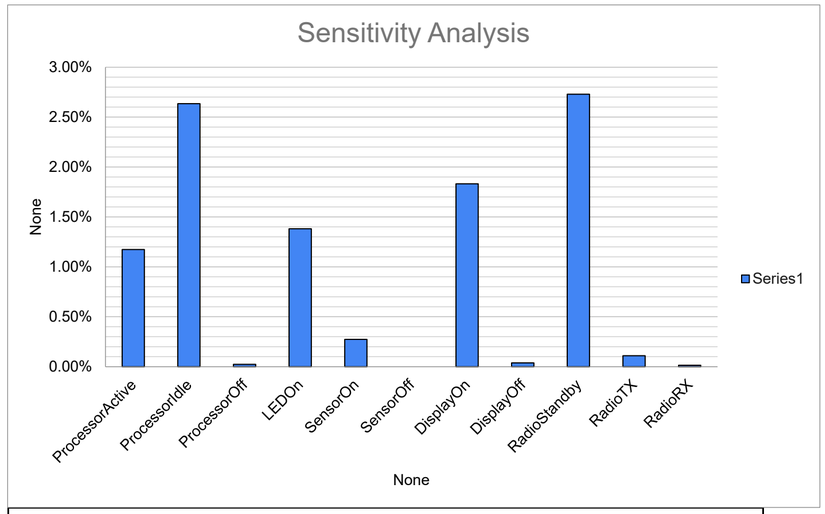
Display Device

System Parameters (defined by hardware) form the datasheets			Profiles (usage of each component mode - defined by software and usage) "off"	"sensing"	"interactive"	
Processor	https://github.com/Jingyii800/Hydration-Companion/blob/main/data_sheets/esp32-s3_datasheet.pdf					
Active	198	mW	0%	20%	50%	
Idle	120	mW	0%	80%	50%	
Sleep	0.6	mW	100%	0%	0%	
LED	https://github.com/Jingyii800/Hydration-Companion/blob/main/data_sheets/1498852.pdf					
On	50	mW	0%	100%	100%	
Stepper Motor	https://github.com/Jingyii800/Hydration-Companion/blob/main/data_sheets/Stepper-motor2424.pdf					
On	200	mW	0%	0%	100%	
Idle	0	mW	0%	0%	0%	
Off	0	mW	100%	0%	0%	
Display	https://github.com/Jingyii800/Hydration-Companion/blob/main/data_sheets/SSD1306.pdf					
On	66	mW	0%	100%	100%	
Off (leakage)	1	mW	100%	0%	0%	
Radio	https://github.com/Jingyii800/Hydration-Companion/blob/main/data_sheets/esp32-s3_datasheet.pdf					
Data Rate	500K	bps	0%	0%	0%	
Standby Power	100	mW	0%	100%	50%	
TX Power	200	mW	0%	0%	40%	
RX Power	100	mW	0%	0%	10%	
			14	9.5	0.5	hours/day typical usage
Battery	4 * AA batteries with regulator					
Capacity	2000	mAh				
Nominal Voltage	6	V				
Regulator Efficiency	70%					



Total power in profile (mw)			Maximum Time	
"off"	1.6	mW	5250.0	hours
"sensing"	351.6	mW	23.9	hours
"interactive"	615	mW	13.7	hours

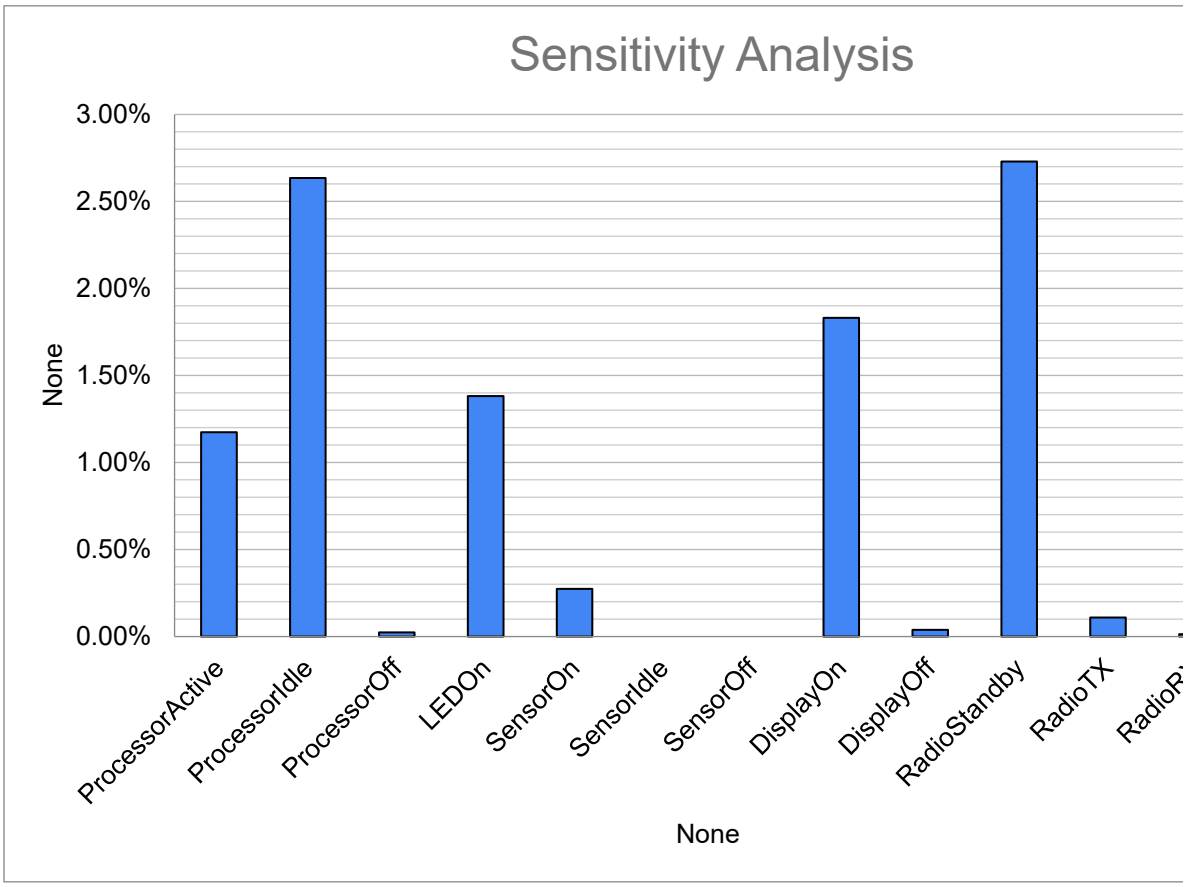
Effective Battery Capacity
8400 mW*h

Days of Use	**2.29**	**days**
Hours of Use	**54.93**	**hours**

Days of Use Metric:
The "days of use" metric was determined by calculating the effective battery capacity, considering the regulator efficiency, and then dividing by the total power consumption per day for the usage profile defined. With a regulator efficiency of 70% and a battery capacity of 2000 mAh at 6V, the effective battery capacity is 8400 mW*h. By comparing this against the total power consumed in different profiles, it can estimate the number of days and hours the device can operate before the battery needs recharging or replacing.

Optimum Size for the Battery:
Given the device's current configuration and usage, the 4 * AA batteries with a capacity of 2000 mAh seem to be a reasonable choice, providing over 2 days of continuous use in the most demanding 'interactive' profile and significantly longer in the 'off' or 'sensing' modes.

Hardware/Software/Cost/Effort Trade-offs:
Hardware: Using a more energy-efficient OLED screen or a stepper motor with lower power consumption could extend battery life. Another hardware consideration could be integrating an energy harvesting component, like a solar cell, to extend battery life or even eliminate the need for batteries in some environments.
Software: Implementing a more aggressive sleep mode management in the software could reduce power consumption when the device is idle. For example, reducing the frequency of updates or implementing a motion-activated wake-up could minimize energy use without significantly impacting user experience.
Cost: While higher-capacity batteries or more energy-efficient components might increase the cost, they could also improve the user experience by requiring less frequent charging. Additionally, software optimizations typically do not increase the hardware cost and can be a cost-effective way to improve power management.
Effort: Investing in software development for intelligent power management could be less resource-intensive than hardware changes. For instance, creating a low-power communication protocol between the sensor device and the display could reduce the energy required for data transmission.


Sensitivity Analysis
3.00%
2.50%
2.00%
1.50%
1.00%
0.50%
0.00%
None
ProcessorActive
ProcessorIdle
ProcessorOff
LEDOn
SensorOn
SensorIdle
SensorOff
DisplayOn
DisplayOff
RadioStandby
RadioTX
None

Linked Data from First Page DO NOT EDIT

System Parame		0		0	0			
	0	form the datash		0	0			
	0	0		0	0			
Processor		https://github.cc		0	0			
Active		198	mW		178.2	198	198	198
Idle		120	mW		120	108	120	120
Sleep		0.6	mW		0.6	0.6	0.54	0.6
	0	0		0	0	0	0	0
LED		https://github.cc		0	https://github.cc	https://github.cc	https://github.cc	https://github.cc
On		50	mW		50	50	50	45
	0	0		0	0	0	0	0
	0	0		0	0	0	0	0
Stepper Motor		https://github.cc		0	https://github.cc	https://github.cc	https://github.cc	https://github.cc
On		200	mW		200	200	200	200
Idle		0	mW		0	0	0	0
Off		0	mW		0	0	0	0
	0	0		0	0	0	0	0
Display		https://github.cc		0	https://github.cc	https://github.cc	https://github.cc	https://github.cc
On		66	mW		66	66	66	66
Off (leakage)		1	mW		1	1	1	1
	0	0		0	0	0	0	0
Radio		https://github.cc		0	https://github.cc	https://github.cc	https://github.cc	https://github.cc
Standby Power		100	mW		100	100	100	100
TX Power		200	mW		200	200	200	200
RX Power		100	mW		100	100	100	100
	0	0		0	0			
	0	0		0	0			
Battery		4 * AA batteries		0	0			
Capacity		2000	mAh		0			
Nominal Voltag		6	V		0			
Regulator Effici		70%		0	0			

0	0	0	0			
0	0	0	0			
0	0	0	0			
0	0	#REF!	#REF!			
Total power in p	0	0				
"off"	1.6	mW	1.6	1.6	1.54	1.6
"sensing"	351.6	mW	347.64	342	351.6	346.6
"interactive"	615	mW	605.1	609	615	610
0	0	0	0	0	0	0
Effective Batter	0	0	0	0	0	0
0	8400	mW*h	8400	8400	8400	8400
0	0	0	0	0	0	0
Days of Use	2.288765974	days	2.315625233	2.349058978	2.289289939	2.32037789
Hours of Use	54.93038337	hours	55.57500558	56.37741548	54.94295853	55.68906936
0	0	0	0			
% change	0	0	1.17%	2.63%	0.02%	1.38%
Parameter Nam	0	0	ProcessorActiv	ProcessorIdle	ProcessorOff	LEDOn
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0	0	0	0			

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198	198	198	198	198	198	198
120	120	120	120	120	120	120
0.6	0.6	0.6	0.6	0.6	0.6	0.6
0	0	0	0	0	0	0
https://github.cc	https://github.cc	https://github.cc	https://github.cc	https://github.cc	https://github.cc	https://github.cc
50	50	50	50	50	50	50
0	0	0	0	0	0	0
0	0	0	0	0	0	0
https://github.cc	https://github.cc	https://github.cc	https://github.cc	https://github.cc	https://github.cc	https://github.cc
180	200	200	200	200	200	200
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
https://github.cc	https://github.cc	https://github.cc	https://github.cc	https://github.cc	https://github.cc	https://github.cc
66	66	66	59.4	66	66	66
1	1	1	1	0.9	1	1
0	0	0	0	0	0	0
https://github.cc	https://github.cc	https://github.cc	https://github.cc	https://github.cc	https://github.cc	https://github.cc
100	100	100	100	100	90	100
200	200	200	200	200	200	180
100	100	100	100	100	100	100

1.6	1.6	1.6	1.6	1.5	1.6	1.6
351.6	351.6	351.6	345	351.6	341.6	351.6
595	615	615	608.4	615	610	607
0	0	0	0	0	0	0
0	0	0	0	0	0	0
8400	8400	8400	8400	8400	8400	8400
0	0	0	0	0	0	0
2.295019262	2.288765974	2.288765974	2.330678949	2.289639382	2.351228797	2.291263195
55.08046228	54.93038337	54.93038337	55.93629478	54.95134516	56.42949113	54.99031669
0.27%	0.00%	0.00%	1.83%	0.04%	2.73%	0.11%
SensorOn	SensorIdle	SensorOff	DisplayOn	DisplayOff	RadioStandby	RadioTX

		Profiles (usage	0
		0	0
		"off"	"sensing"
		0	0
198		0%	20%
120		0%	80%
0.6		100%	0%
0		0	0
https://github.com/Jingyii800/Hydration-Companion/blob/main/data_sheets/149		0	0
50		0%	100%
0		0	0
0		0	0
https://github.com/Jingyii800/Hydration-Companion/blob/main/data_sheets/Ste		0	0
200		0%	0%
0		0%	0%
0		100%	0%
0		0	0
https://github.com/Jingyii800/Hydration-Companion/blob/main/data_sheets/SSI		0	0
66		0%	100%
1		100%	0%
0		0	0
https://github.com/Jingyii800/Hydration-Companion/blob/main/data_sheets/esp		0	0
100		0%	100%
200		0%	0%
90		0%	0%
		0	0
		14	9.5
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			0	0	0	0
1.6			0	0	0	0
351.6			0	0	0	0
614			0	0	0	0
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8400	0	0	0	#REF!	#REF!	#REF!
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2.289077829	0	0	0	0	0	0
54.93786789	0	0	0	0	0	0
0	0	0	0	0	0	0
0.01%	0	0	0	0	0	0
RadioRX	0	0	0	0	0	0
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0	0
0	0
"interactive"	0
0	0
50%	0
50%	0
0%	0
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100%	0
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100%	0
0%	0
0%	0
0	0
0	0
100%	0
0%	0
0	0
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50%	0
40%	0
10%	0
0	0
0.5	hours/day typical usage
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