

Display Device

System Parameters (defined by hardware) form the datasheets		Profiles (usage of each component)	
		"off"	"sensing"
ESP32(For Display)			
Active	83.5 mW	0%	10%
Idle	7.6 mW	0%	90%
Sleep	0.05 mW	100%	0%
Display:EA OLEDL128-6			
On	20 mW	0%	0%
Off (leakage)	0 mW	100%	100%
Stepper Motor			
On	60 mW	0%	0%
Off (leakage)	0 mW	100%	100%
BH1750			
On	0.36 mW	0%	0%
Off (leakage)	0 mW	100%	100%
Cree Xlamp XB-D			
On	900 mW	0%	0%
Off (leakage)	0 mW	100%	0%
Radio			
Data Rate	300 bps	0%	0%
Standby Power	5 mW	0%	97%
TX Power	20 mW	0%	2%
RX Power	10 mW	0%	1%
Radio			
Data Rate	300 bps	0%	0%
Standby Power	5 mW	0%	97%
TX Power	20 mW	0%	2%
RX Power	10 mW	0%	1%
		22	1
Battery			
Capacity	300 mAh		
Nominal Voltage	3 V		
Regulator Efficiency	99%		

Sensor Device

System Parameters (defined by hardware) from the datasheets

ESP32-CAM (For Sensor)

Active	83.5 mW
Idle	20.8 mW
Sleep	11.4 mW

A3141

On	25 mW
Off (leakage)	0 mW

OV2640

On	125 mW
Off (leakage)	0 mW

Radio

Data Rate	300 bps
Standby Power	5 mW
TX Power	20 mW
RX Power	10 mW

Battery

Capacity	300 mAh
Nominal Voltage	3 V
Regulator Efficiency	99%

Profiles (usage of each component)

	"off"	"sensing"
ESP32-CAM (For Sensor)		
Active	0%	10%
Idle	0%	90%
Sleep	100%	0%
A3141		
On	0%	0%
Off (leakage)	100%	100%
OV2640		
On	0%	0%
Off (leakage)	100%	100%
Radio		
Data Rate	0%	0%
Standby Power	0%	97%
TX Power	0%	2%
RX Power	0%	1%
Battery	22	1

REFLECTIONS :

How did you determine your "days of use" metric ?

Calculate the device's average daily power consumption and divide the battery's total capacity by this average power consumption.

What do you think is the optimum size for the battery in your device ?

300mAh

What hardware/software/cost/effort tradeoffs could you make to improve the user experience ?

A larger battery extends device runtime but also increases size, weight, and cost. Conversely, a smaller battery reduces size, weight, and cost but also reduces runtime.

onent mode - defined by software and usage)

"interactive"

20%
80%
0%

100%
0%

100%
0%

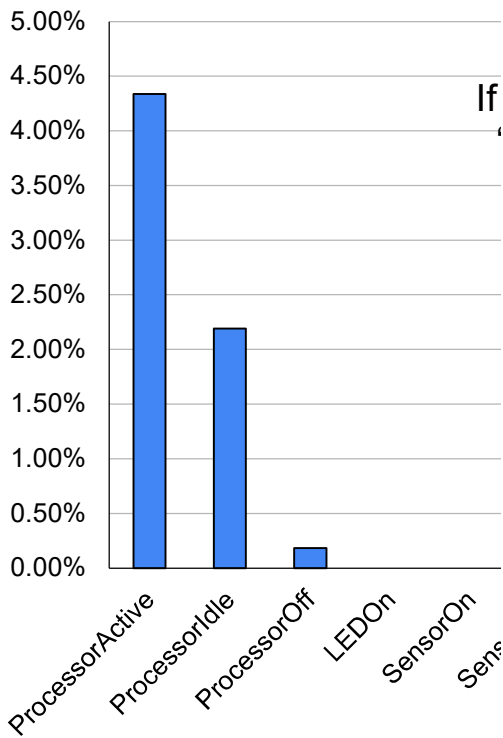
100%
0%

100%
0%

0%
97%
2%
1%

0%
97%
2%
1%

1 hours/day typical usage



Total power in profile (mw)	
"off"	0.05
"sensing"	25.89
"interactive"	1013.84

Effective Battery Capacity
891

Days of Use	0.86
Hours of Use	20.55

onent mode - defined by software and usage)

"interactive"

20%
80%
0%

100%
0%

100%
0%

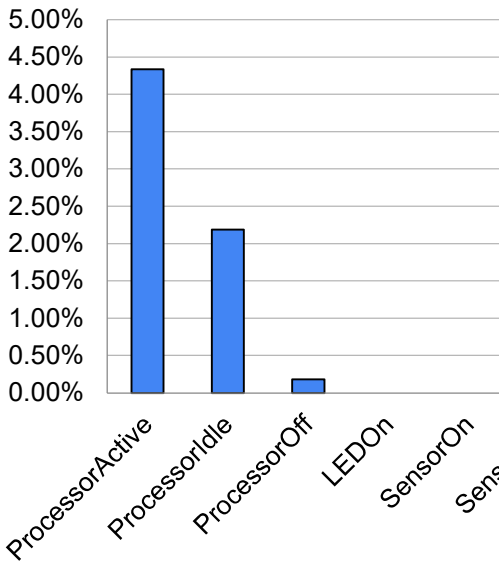
0%
97%
2%
1%

1 hours/day typical usage

amount.

or battery makes the device lighter and potentially cheaper, but at the cost of shorter operational times and possi

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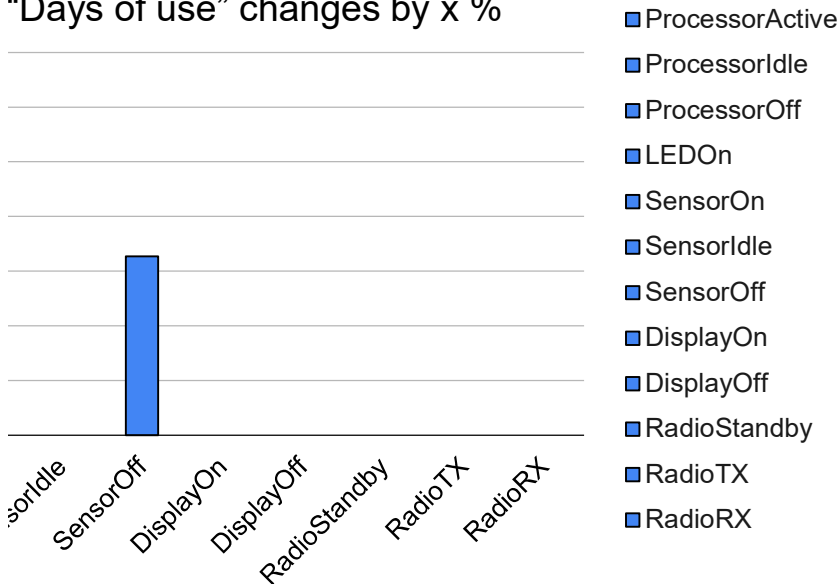
Total power in profile (mw)	
"off"	11.4
"sensing"	32.42
"interactive"	188.69

Effective Battery Capacity
891

Days of Use	1.89
Hours of Use	45.31

Sensitivity Analysis

component changes by 10%...
“Days of use” changes by x %



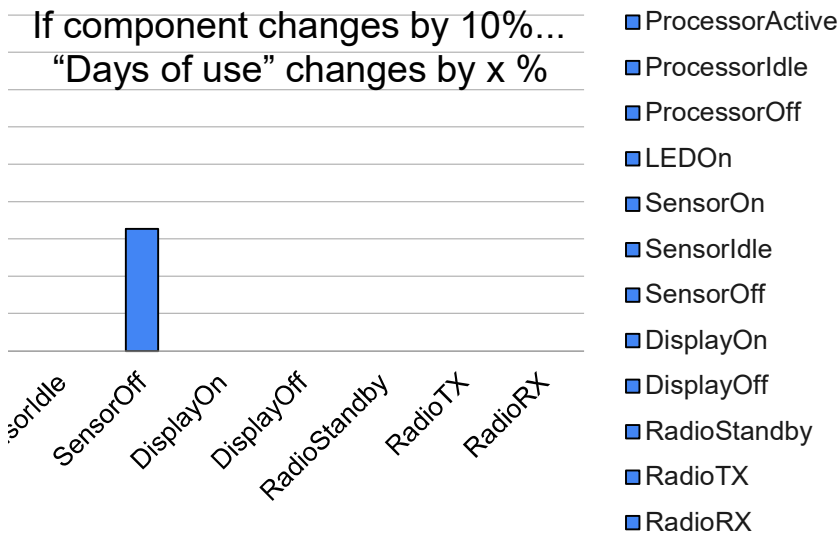
Maximum Time	
mW	17820.0 hours
mW	34.4 hours
mW	0.9 hours

mW*h

days
hours

Sensitivity Analysis

If component changes by 10%...
“Days of use” changes by x %



Maximum Time	
mW	78.2 hours
mW	27.5 hours
mW	4.7 hours

mW*h

days
hours

ibly more frequent recharges,