

Power Budget Example

Team Number:	204
Project Name:	ClapSense
Team Member Names:	Caleb Yuen
Version:	1

A. List ALL major components (active devices, integrated circuits, etc.) except for power sources, voltage regulators, resistors, capacitors, or passive elements							
All Major Components	Component Name	Part Number	SupplyVoltageRange	#	Absolute	TotalCurrent(mA)	Unit
Microcontroller	PIC18F57Q43 Nano	DM182029	+3.3V	1	50	25	mA
Motor Driver (logic)	TB6612FNG	TB6612FNG	+5V	1	50	10	mA
DC Gearmotor (through driver)	DFRobot 6 V Metal Gearmotor	FIT0495-A	+6V	1	1200	600	mA
Status LEDs (2×)			+3.3V	2	20	20	mA
Photoresistor (LDR)			+3.3V	1	10	5	mA
Potentiometer (10 k)			+3.3V	1	5	2	mA
B. Assign each major component above to ONE power rail below. Try to minimize the number of different power rails in the design.							
+6V Power Rail	Component Name	Part Number	SupplyVoltageRange	#	AbsoluteMaximumCurrent (mA)	TotalCurrent(mA)	Unit
DC Gearmotor (via TB6612 VM)	FIT0495-A	FIT0495-A	+6V	1	1200	600	mA
						0	mA
						0	mA
						0	mA
						0	mA
						600	mA
						25%	
					Total Current Required on +6V Rail	750	mA
c1. Regulator or Source Choice	9 V→6 V buck converter	0930	+8V - 24V in	1	1500	1500	mA
					Total Remaining Current Available on +9V Rail	750	mA
+5V Power Rail	Component Name	Part Number	SupplyVoltageRange	#	AbsoluteMaximumCurrent (mA)	TotalCurrent(mA)	Unit
Motor Driver (logic)	TB6612FNG	TB6612FNG	+5V	1	50	10	mA
						0	mA
						0	mA
						0	mA
						0	mA
						10	mA
						25%	
					Total Current Required on +5V Rail	12.5	mA
c2. Regulator or Source Choice	9 V→5 V buck converter	0930	+8V - 24V in	1	1000	1000	mA
					Total Remaining Current Available on +9V Rail	987.5	mA
+3.3V Power Rail	Component Name	Part Number	SupplyVoltageRange	#	AbsoluteMaximumCurrent (mA)	TotalCurrent(mA)	Unit
Microcontroller	PIC18F57Q43 Nano	DM182029	+3.3V	1	50	25	mA
	Status LEDs (2×)		+3.3V	2	20	20	mA
	Photoresistor (LDR)		+3.3V	1	10	5	mA
	Potentiometer (10 k)		+3.3V	1	5	2	mA
						52	mA
						25%	
					Total Current Required on +3.3V Rail	65	mA
c3. Regulator or Source Choice	5 V→3.3 V LDO/buck conver	(full part number)	+4.5V - 6V in	1	300	300	mA
					Total Remaining Current Available on +5V Rail	235	mA
C. For each power rail above, select a specific voltage regulator using the same process as for major component selection. Confirm that the Total Remaining Current Available on each rail above is							
D. Select a specific external power source (wall supply or battery) for your system, and confirm that it can supply all of the regulators for all of the power rails simultaneously. If you need multiple							
External Power Source 1	Component Name	Part Number	SupplyVoltageRange	Output	AbsoluteMaximumCurrent (mA)	TotalCurrent(mA)	Unit
Plug-in Wall Supply (Barrel Jack)	AC/DC Adapter Model 0930	0930	100-240 VAC	+9V	2000	2000	mA
Power Rails Connected to External Power Source 1	+6V regulator			1	750	750	mA
	+5V Regulator			1	13	13	mA
	+3.3V low-dropout regulator			1	65	65	mA
						1172	mA
					Total Remaining Current Available on External Power Source 1		
External Power Source 2	Component Name	Part Number	SupplyVoltageRange	Output	AbsoluteMaximumCurrent (mA)	TotalCurrent(mA)	Unit
Power Source 2 Selection							mA
Power Rails Connected to External Power Source 2							mA
						0	mA
E. Calculate Battery Life (if applicable). For each battery, also check the worst-case lifetime of the battery by indicating the capacity in mAh.							
	Component Name	Part Number	SupplyVoltageRange		Capacity(mAh)	RequiredByRegulators	
Battery						0	
					Battery Life	#DIV/0!	hours
Notes							

The Master Controller (Hub) subsystem of the ClapSense project uses a 9 V 2 A AC/DC wall adapter (Model 0930) as the main source. Power is distributed to 6 V, 5 V, and 3.3 V rails through dedicated buck converters. The estimated total current draw is ≈ 0.83 A (1.64 A peak with margin), well within adapter limits. The 6 V rail drives the motor and TB6612FNG VM, the 5 V rail handles logic and power conversion, and the 3.3 V rail powers the PIC18F57Q43 and sensor inputs.