

Power Budget

Team Number:	106
Project Name:	Soil Moisture System
Team Member Name:	JT Harrison
Version:	

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	#	AbsoluteMaximumCurrent (mA)	TotalCurrent(mA)	Unit
	Curiosity Nano board	PIC18F57Q43	1.8-5.5V	1	500	500	mA
	quad op-amp	MCP6004	1.8-5.5V	1	0.7	0.68	mA
	Capacitive Soil Moisture Sensor	ST0160	3.3-5.5V	1	0	10	mA
	5V regulator	LM7805	7-35V	1	1000	1000	mA

B. Assign each major component above to ONE power rail below. Try to minimize the number of different power rails in the design.

+12V Power Rail	Component Name	Part Number	SupplyVoltageRange	#	AbsoluteMaximumCurrent (mA)	TotalCurrent(mA)	Unit
						mA	
						mA	
						0 mA	
						0 mA	
						0 mA	
						0 mA	
						Subtotal	
						Safety Margin	
						Total Current Required on +12V Rail	25%
							0 mA

c1. Regulator or Source Ch	+12V regulator	LM7812	+12V - 35V	1	1000	1000	mA
						Total Remaining Current Available on +12V Rail	1000 mA

+5V Power Rail	Component Name	Part Number	SupplyVoltageRange	#	AbsoluteMaximumCurrent (mA)	TotalCurrent(mA)	Unit
						mA	
						0 mA	
						0 mA	
						0 mA	
						Subtotal	
						Safety Margin	
						Total Current Required on +5V Rail	510.68 mA
							25%
							638.35 mA

c2. Regulator or Source Ch	+5V Regulator	LM7805	7-35V	1	1000	1000	mA
						Total Remaining Current Available on +5V Rail	361.65 mA

-5V Power Rail	Component Name	Part Number	SupplyVoltageRange	#	AbsoluteMaximumCurrent (mA)	TotalCurrent(mA)	Unit
						mA	
						0 mA	
						0 mA	
						0 mA	
						Subtotal	
						Safety Margin	
						Total Current Required on -5V Rail	0 mA
							25%
							0 mA

c3. Regulator or Source Choice							
						Total Remaining Current Available on -5V Rail	0 mA

+3.3V Power Rail	Component Name	Part Number	SupplyVoltageRange	#	AbsoluteMaximumCurrent (mA)	TotalCurrent(mA)	Unit
						mA	
						0 mA	
						0 mA	
						0 mA	
						Subtotal	
						Safety Margin	
						Total Current Required on +3.3V Rail	0 mA
							25%
							0 mA

c4. Regulator or Source Choice							
						Total Remaining Current Available on 3.3V Rail	0 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

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.

External Power Source 1	Component Name	Part Number	SupplyVoltageRange	Output	AbsoluteMaximumCurrent (mA)	TotalCurrent(mA)	Unit
Power Source 1 Selection	Plug-in Wall Supply	(full part number)	110VAC	+9V	1000	640	mA
Power Rails Connected to External Power Source 1	+5V Regulator	LM7805	7-35V	1	1000	1000	mA
						-360	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	Battery	(full part number)	+9V	-9V	500	500	mA
Power Rails Connected to External Power Source 2	-5V Regulator	(full part number)	(range)	1	500	500	mA
						Total Remaining Current Available on External Power Source 2	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

Component Name	Part Number	SupplyVoltageRange	Capacity(mAh)	RequiredByRegulators	
				Battery Life	#DIV/0!

Notes

External Supply Voltage should be determined by the dropout voltage for highest-voltage regulator (e.g., +14V for a +12V regulator). If you have multiple units in your design (e.g., a base unit and remote unit) then you need a separate power budget for each unit