## **Power Budget Example**

Team Number: ###

**Project Name: EGR 304 Thing** 

Team Member Names: Tom, Sam, John, Jane

Version: ##

| All Major Components | Component Name  Solenoid Stepper motor PSoC™ 4 BLE Module Opamp | Part Number  (full part number)  (full part number)  (full part number)  (full part number) | Supply<br>Voltage<br>Range<br>+12 - 24V<br>+12 - 24V<br>(range)<br>+5 to -5 | Qty.  1 1 2 1 | Absolute Maximum Current (mA)  500 300 200 100 | Total Current (mA) 500 300 400 100 | MA<br>MA<br>MA<br>MA |
|----------------------|---|---|---|---------------|--|------------------------------------|----------------------|
|                      | 5V regulator<br>Wifi transceiver                                | (full part number)<br>(full part number)  | +5V - 35V<br>+1.8 - 3.3V  | 1             | 1000<br>350                                    | 1000<br>350                        | mA<br>mA             |
| +12V Power Rail      | Component Name  | Part Number   | Supply<br>Voltage<br>Range  | Qty.          | Absolute<br>Maximum<br>Current (mA)            | Total<br>Current<br>(mA)           | Unit                 |
|                      | Solenoid  | (full part number)  | +12 - 24V   | 1             | 500  | 500                                | mA                   |
|                      | Stepper motor   | (full part number)  | +12 - 24V   | 1             | 300  | 300                                | mA                   |
|                      |   |   |   |               |  | 0                                  | mA                   |
|                      |   |   |   |               | Subtotal                                       | 800                                | mA                   |
|                      |   |   |   |               | Safety Margin                                  | 25%                                |                      |
|                      |   |   | Total Current   | t Require     | 1000   | mA                                 |                      |
| Regulator            | +12V regulator  | LM7812  | +12V - 35V  | 1             | 1000   | 1000                               | mA                   |
|                      | Total Remaining Current Available on +12V Rail                  |   |   |               |  |                                    | mA                   |

| +5V Power Rail | Component Name     | Part Number        | Supply<br>Voltage<br>Range | Qty.      | Absolute<br>Maximum<br>Current (mA) | Total<br>Current<br>(mA) | Unit |
|----------------|--------------------|--------------------|----------------------------|-----------|-------------------------------------|--------------------------|------|
|                | PSoC™ 4 BLE Module | (full part number) | (range)                    | 2         | 200                                 | 400                      | mA   |
|                | Opamp              | (full part number) | (range)                    | 1         | 100                                 | 100                      | mA   |
|                |                    |                    |                            |           |                                     | 0                        | mA   |
|                |                    |                    |                            |           | Subtotal                            | 500                      | mA   |
|                |                    |                    |                            |           | Safety Margin                       | 25%                      |      |
|                |                    |                    | Total Curre                | nt Requir | ed on +5V Rail                      | 625                      | mA   |
|                |                    |                    |                            |           |                                     |                          |      |
| Regulator      | +5V Regulator      | LM7805             | (range)                    | 1         | 1000                                | 1000                     | mA   |
|                |                    | Total Rer          | naining Curre              | nt Availa | ble on +5V Rail                     | 375                      | mA   |

| +3.3V Power Rail | Component Name                                 | Part Number         | Supply<br>Voltage<br>Range | Qty.     | Absolute<br>Maximum<br>Current (mA) | Total<br>Current<br>(mA) | Unit |
|------------------|--|---------------------|----------------------------|----------|-------------------------------------|--------------------------|------|
|                  | Wi-Fi transceiver                              | (full part number)  | +1.8 - 3.3V                | 1        | 350                                 | 350                      | mA   |
|                  |  |                     |                            |          |                                     | 0                        | mA   |
|                  |  |                     | Subtotal                   |          |                                     | 350                      | mA   |
|                  |  |                     |                            |          | Safety Margin                       | 25%                      |      |
|                  |  |                     | Total Current              | Required | d on +3.3V Rail                     | 437.5                    | mA   |
|                  |  |                     |                            |          |                                     |                          |      |
| Regulator        | +3.3V low-dropout                              | V A 70 D M 22 D T E | +5V - 20V                  | 1        | 500                                 | E00                      | mΛ   |
|                  | regulator                                      | KA78RM33RTF         | +5V - 2UV                  | 1        | 500                                 | 500                      | mA   |
|                  | Total Remaining Current Available on 3.3V Rail |                     |                            |          |                                     |                          | mA   |

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| External Power Source 1                                      | Component Name                  | Part Number        | Supply<br>Voltage<br>Range | Output<br>Voltage | Absolute<br>Maximum<br>Current (mA) | Total<br>Current<br>(mA) | Unit     |
|--|---------------------------------|--------------------|----------------------------|-------------------|-------------------------------------|--------------------------|----------|
| Power Source 1 Selection                                     | Plug-in Wall Supply             | (full part number) | 110VAC                     | +24V              | 5000                                | 5000                     | mA       |
| Power Rails Connected to                                     | +12V regulator<br>+5V Regulator | LM7812<br>LM7805   | +12V - 35V<br>(range)      | 1 1               | 1000<br>1000                        | 1000<br>1000             | mA<br>mA |
| External Power Source 1                                      | +3.3V low-dropout regulator     | KA78RM33RTF        | +5V - 20V                  | 1                 | 500                                 | 500                      | mA       |
| Total Remaining Current Available on External Power Source 1 |                                 |                    |                            |                   |                                     |                          | mA       |

| External Power Source 2  | Component Name | Part Number        | Supply<br>Voltage<br>Range | Output<br>Voltage | l Maximum l    | Total<br>Current<br>(mA) | Unit |
|--------------------------|----------------|--------------------|----------------------------|-------------------|----------------|--------------------------|------|
| Power Source 2 Selection | Battery        | (full part number) | +9V                        | -9V               | 500            | 500                      | mA   |
| Power Rails Connected to | -5V Regulator  | (full part number) | (range)                    | 1                 | 500            | 500                      | mA   |
| External Power Source 2  | Total          | Remaining Current  | Available on I             | External P        | Power Source 2 | 0                        | mA   |

| Calculated Battery Life |                |                    |                            |                   |                              |       |
|-------------------------|----------------|--------------------|----------------------------|-------------------|------------------------------|-------|
|                         | Component Name | Part Number        | Supply<br>Voltage<br>Range | Capacity<br>(mAh) | Required<br>By<br>Regulators |       |
|                         | Battery        | (full part number) | +12V                       | 500               | 500                          |       |
|                         |                |                    |                            | Battery Life      | 1                            | hours |

## 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