Features for The Data Logger (Rev Iteration 0)

1. The data logger will communicate to host software via USB as a serial port
2. ~~The data logger will communicate to host software via TCP/IP~~
3. The data logger can request a version command to get the current version of firmware
4. The data logger will capture data once triggered into an internal log
    - 4.1. 0 to 6 digital inputs simultaneously
    - 4.2. 0 to 6 analog inputs
    - 4.3. 0 to 3 comm inputs
        - 4.3.1. 0-2 are UART channels
        - ~~4.3.2. 3-4 are I2C slave channels~~
        - ~~4.3.3. 5-6 are SPI slave channels~~
        - ~~4.3.4. 7 is a CAN channel~~
5. The data logger will support a simple parameter system for configuring the device
    - 5.1. Digital Inputs
        - 5.1.1. Which are Recorded?
        - 5.1.2. Which have Pull-Up Resistors?
        - 5.1.3. Which have Pull-Down Resistors?
        - 5.1.4. Which are Debounced?
    - 5.2. Analog Inputs
        - 5.2.1. Which are Recorded?
        - 5.2.2. Which are Filtered?
        - 5.2.3. Filter Coefficient for Filter Used
    - 5.3. UART Inputs
        - 5.3.1. Which are Recorded?
        - 5.3.2. What Baud Rate for Each?
    - 5.4. Overall Sampling
        - 5.4.1. Number of Samples to Record (1 - 4096)
        - 5.4.2. Capture Rate (msec. 5 - 10,000)
    - 5.5. There should be a command to get and set all parameter values
6. The data logger will support triggering of the capture system
    - 6.1. When configured, it will be disarmed. An arm command is required to ARM it.
    - 6.2. It will support different mutually-exclusive trigger modes
        - 6.2.1. Now (Command Only)
        - 6.2.2. When a Digital bit or bits have changed
        - 6.2.3. When a Digital bit or bits are specific state(s)
        - 6.2.4. When a Digital bit or bits have gone through a specific sequence of state(s)
        - 6.2.5. When we reach a particular timestamp
        - ~~6.2.6. When an Analog channel crosses a Threshold Value~~
        - ~~6.2.7. When a Comm channel receives a sequence of Bytes~~

7. The data logger will support a command for requesting a result set.
    7.1. It will contain all Digital, Analog, or Comm information Captured in that Tick.
    7.2. This can be repeated until all data has been read.
    7.3. The Results are Encoded using the MessagePack standard.
8. The data logger will support host checking or setting of its internal timestamp. The timestamp will be msec since wakeup by default.
9. The data logger will use 4 LED's to represent state:
    9.1. LED1 - Blink when waiting to be Armed. Solid when Armed.
    9.2. LED2 - Blink when waiting on Trigger. Solid when Triggered.
    9.3. LED3 - Blink when Capturing. Solid when Capture Complete.
    9.4. LED4 - Blink when Capture Complete and Data Available
    9.5. ERRORS - Errors during Capture will blink LED1 and LED4 together
10. The data logger will support a command to reset all settings back to defaults
    10.1. Effects all Params and the Capture system
11. The data logger will use the message protocol matching the framing specified in "Ghost In the Machine"
    11.1. We will extend the protocol to support messages longer than 9 bytes by adding letters (A for 10, B for 11, … Z for 35).
12. The data logger will support a filter for analog channels