pixhawk®

DS-013 Pixhawk Smart Battery Standard

Revision: 0.3.0
Revision date: Apr 14, 2020

Abstract

This document is the formal version of the Pixhawk Smart battery industry standard that includes all aspects of the hardware standard required to build compatible products.

Table of contents

Document Revisions

Revision	Editor	Reviewer	Comments
0.1.0	Lorenz Meier	Alex Klimaj	Initial specification
0.2.0	Alex Klimaj		Adds increased detail into the pinout and connectors and how to source them

Contact and Public Developer Call

This standard is being developed on a public developer call.
For further questions, please contact the maintainer of the standard, lorenz@px4.io.

Trademark Guideline

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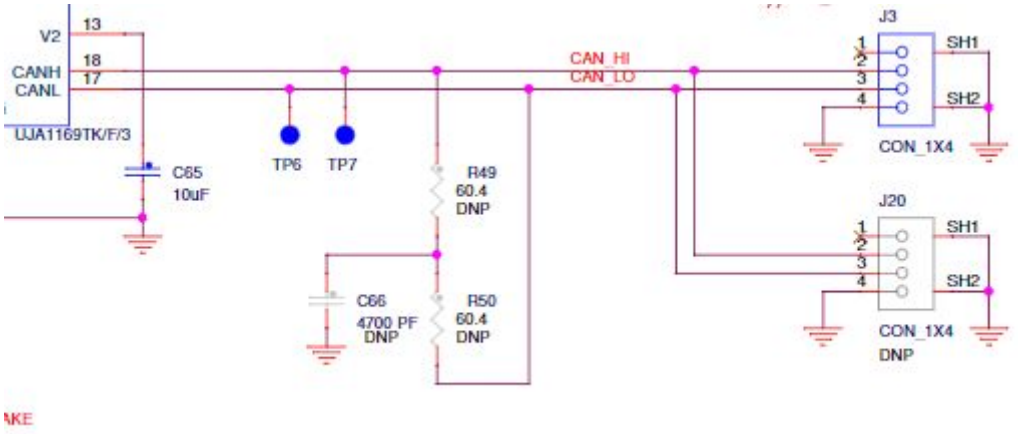
Pixhawk Smart Battery

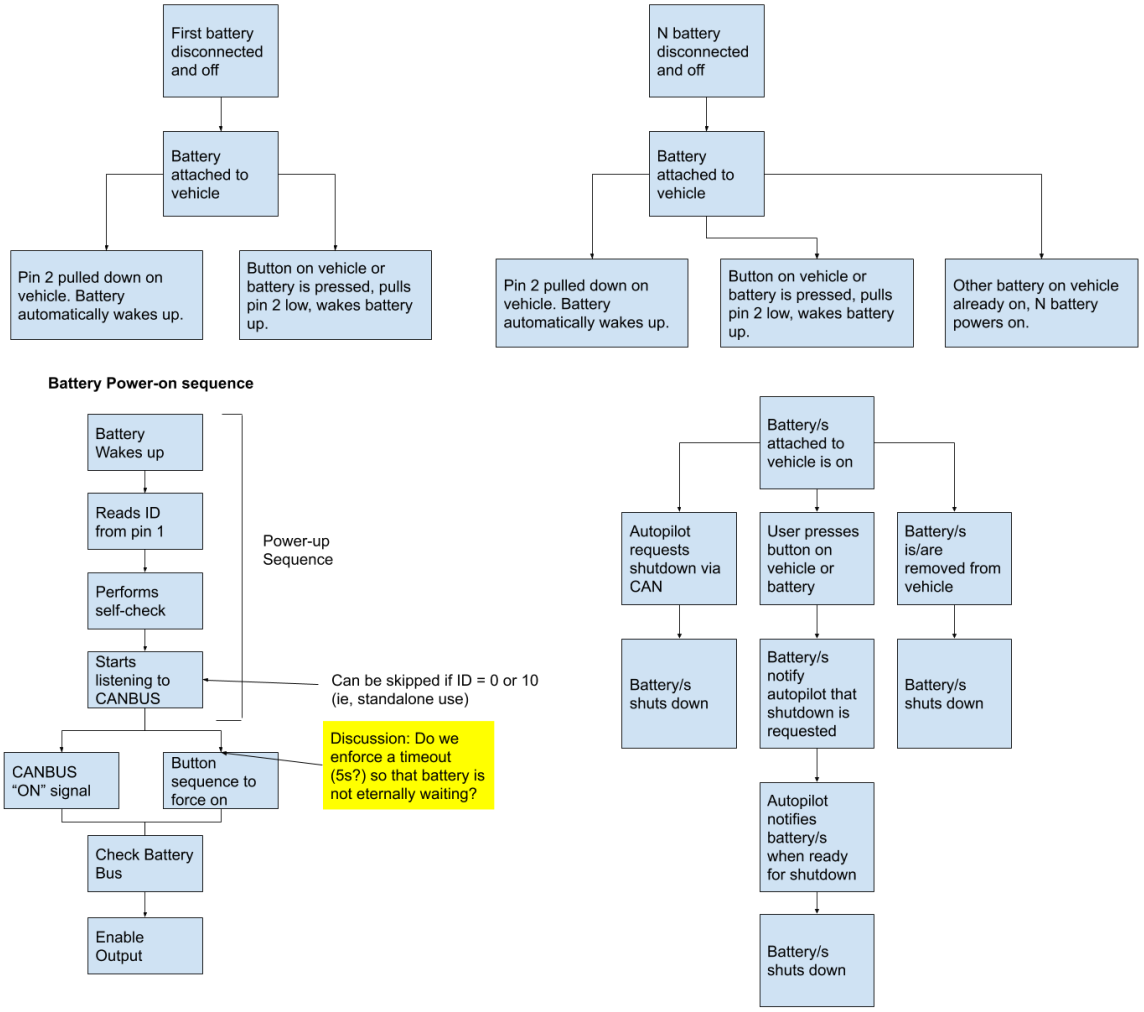
Pin #	Pin / Signal Name	Usage	Electrical Characteristics
1	Battery ID	Analog Input: Pulled up to 3.3V through 1k ohm on battery, pulled down by device. Note: Pull-up may be toggled	3,3V
2	Boot	Digital I/O: Pulled up to 3.3V on battery, pulled down to RTN by battery or device to signal	3.3V
3	Battery Return (Pack -)	Negative high current return of the smart battery. "Battery pack negative or ground"	0V or "Considered as ground" Pins 3,4,9,10 are common
4			
5	Battery Power (Pack+)	Positive high current outputs of smart battery up to cell pack voltage	Positive voltage up to battery voltage
6			
7			
8			
9	Battery Return (Pack-)	Negative high current return of smart battery. "Battery pack negative or ground"	0V or "Considered as ground" Pins 3,4,9,10 are common
10			
11	CAN H	HIGH-level CAN bus line. Communications Interface between BMS and host device. CANH and CANL form a differential signal. *1 I	400mV nominal differential signalling dominant. Limiting values according to IEC60134
12	CAN L	LOW-level CAN bus line. Communications Interface between BMS and host device. CANH and CANL form a differential signal. *1	400mV nominal differential signalling dominant. Limiting values according to IEC60134

***1 NOTE:** CAN bus requires a 60 ohm termination network this may be internal or external. If internal to the BMS it should have an option to permit disconnection so as to allow for flexible CAN BUS architectures. A preferred termination network consists of two 30 ohm resistors between CANH and CANL with 4700pF capacitor between the center tap of these resistors and ground..



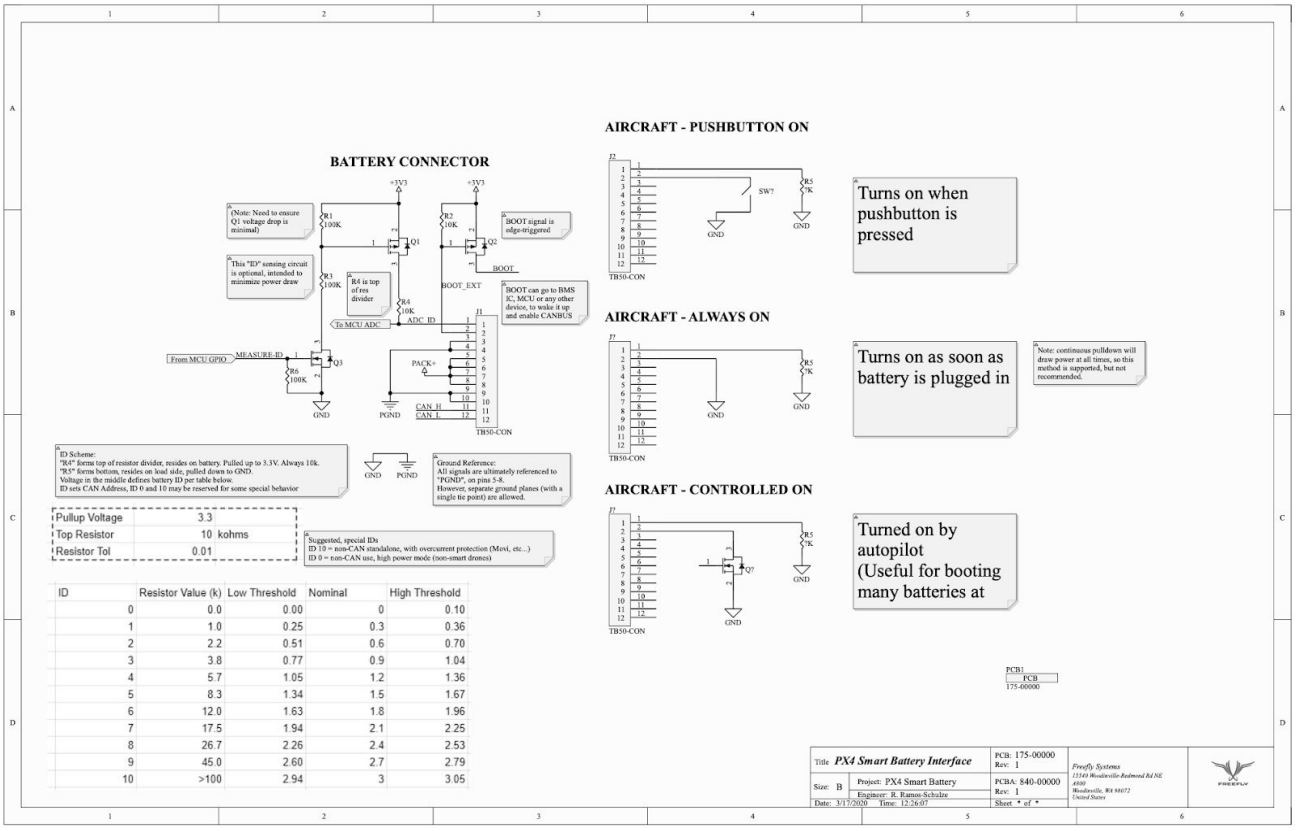
(Example schematic showing an onboard CAN termination network.)

Smart Battery Power State Diagram



(*source*)

Interface Schematic



ID	Resistor Value (k)	Low Threshold	Nominal	High Threshold
0	0.0	0.00	0	0.10
1	1.0	0.25	0.3	0.36
2	2.2	0.51	0.6	0.70
3	3.8	0.77	0.9	1.04
4	5.7	1.05	1.2	1.36
5	8.3	1.34	1.5	1.67
6	12.0	1.63	1.8	1.96
7	17.5	1.94	2.1	2.25
8	26.7	2.26	2.4	2.53
9	45.0	2.60	2.7	2.79
10	>100	2.94	3	3.05

Connector

Battery Side Connector

- Part Number 2D_PDC1610B0001
- Direct Link PDC1610B0001 Hi-Current Power Connectors
- Estimated cost per pair: $3.65
    - Estimated cost male **PDC1510B0001**: $1.79 (in qty 10)
    - Estimated cost female **PDC1610B0001**: $1.86 (in qty 10)

Pin 1 Designation

When viewed from the connector end of the battery, pin 1 is on the right, pin 12 is on the left.

Vehicle Side Connector

- Part Number PDC1510B0001
- Direct Link PDC1510B0001 Hi-Current Power Connectors