

PRE-PRODUCTION FEEDBACK

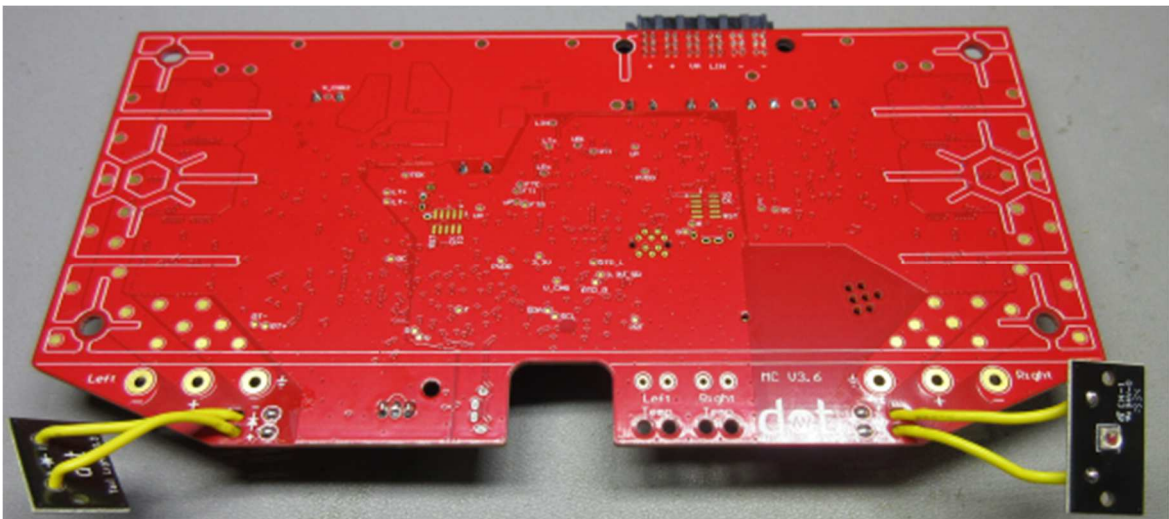
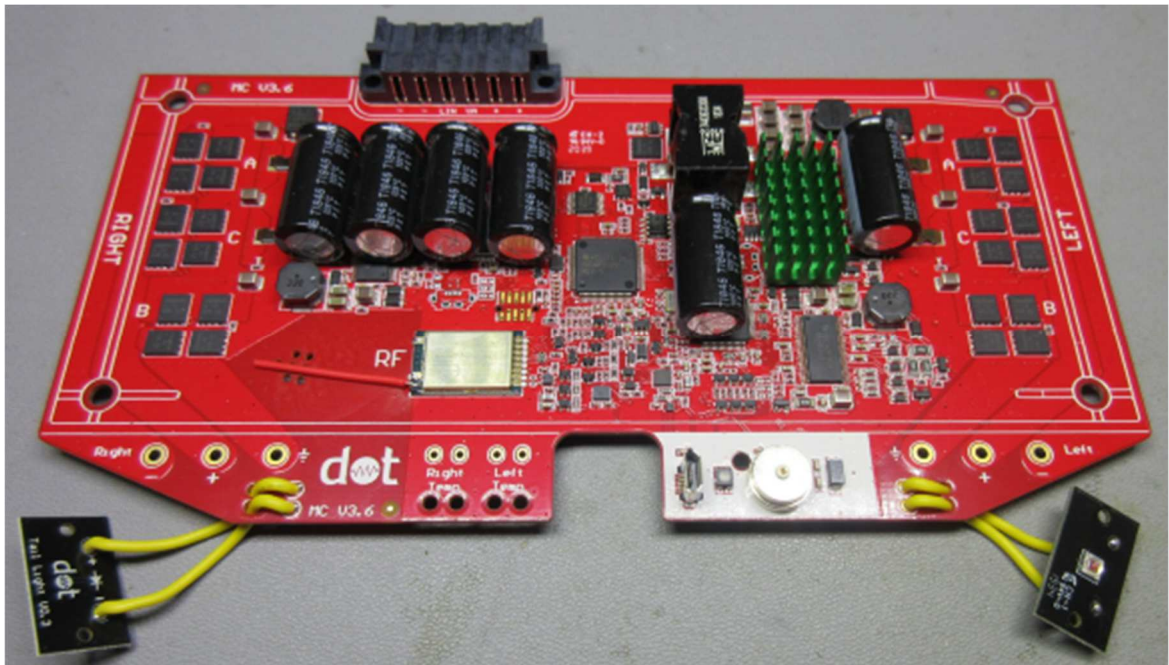
Date: 23-12-2020
Revision: 1.0
Author: Tony Little
Product: Electric Skateboard
Company: Globe Brand

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2 MAIN CONTROLLER

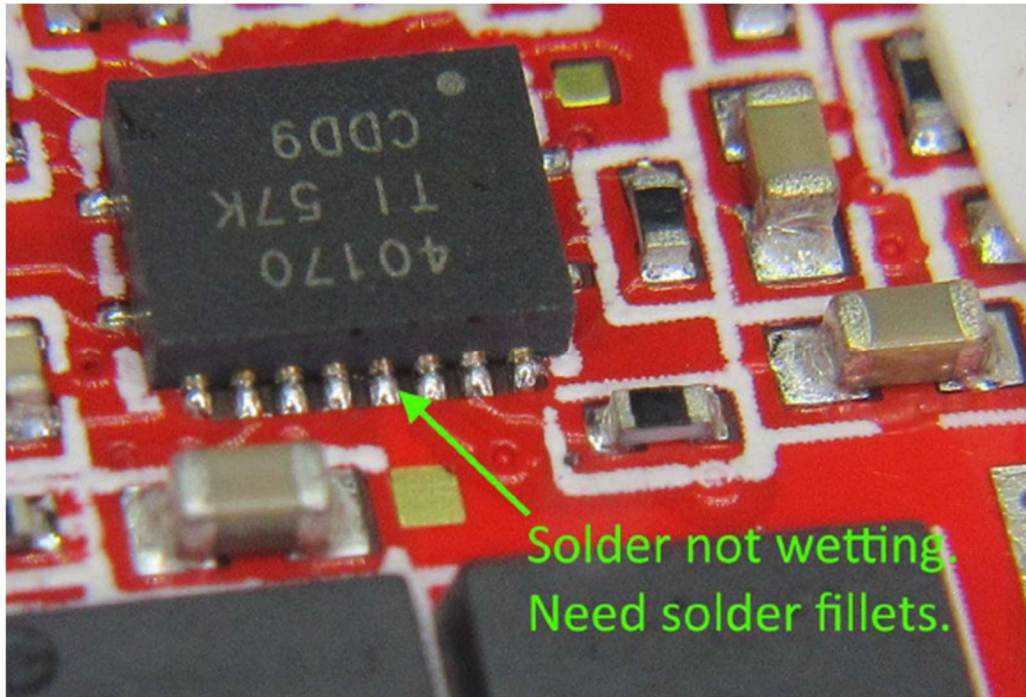
5x V3.6 samples received.



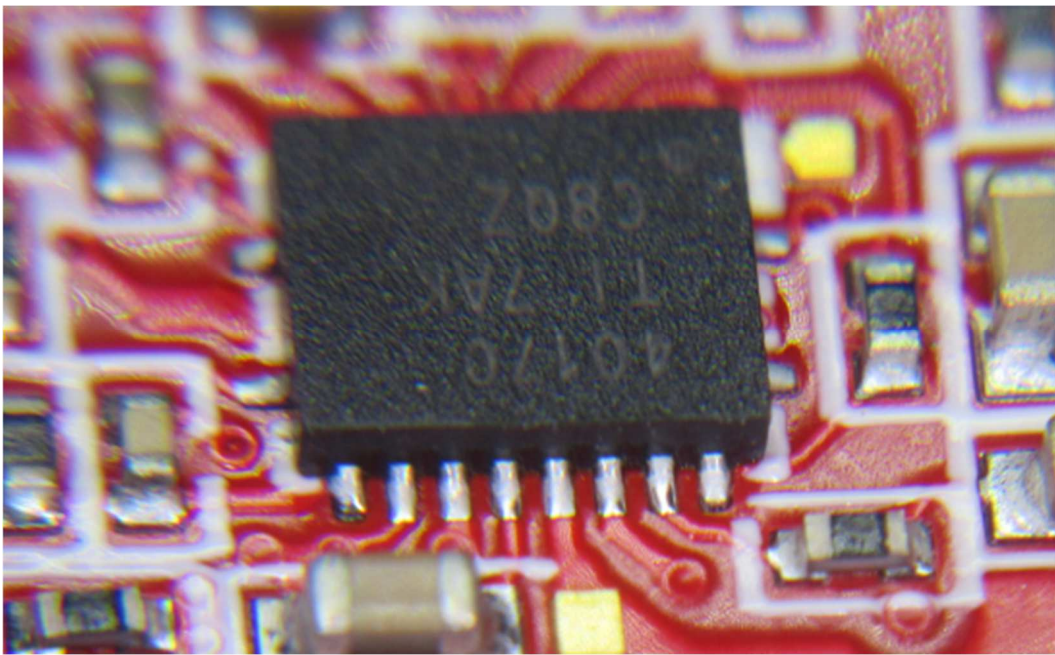
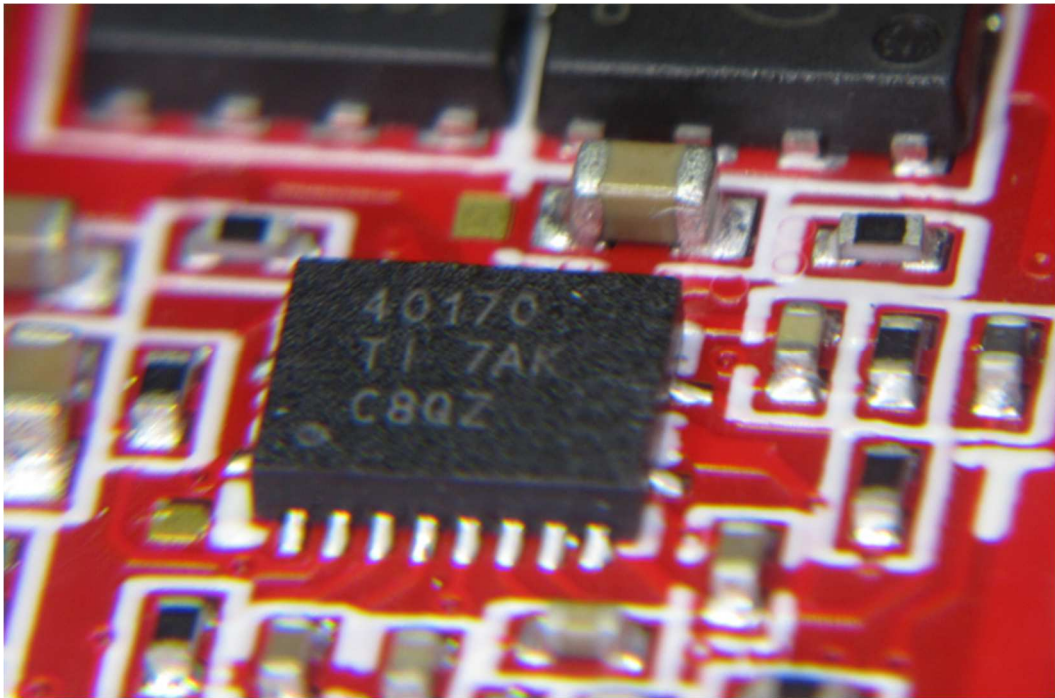
2.1 PCB DESIGN AND PRODUCTION UPDATES

2.1.1 BATTERY CHARGER REGULATOR SOLDERING

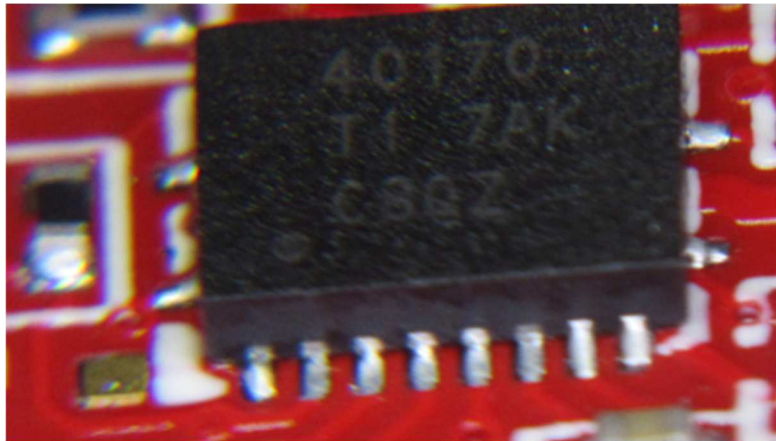
Previous concern has been the poor solder wetting on IC2.



Union applied addition flux prior to reflow, which has resulted in a significant improvement.

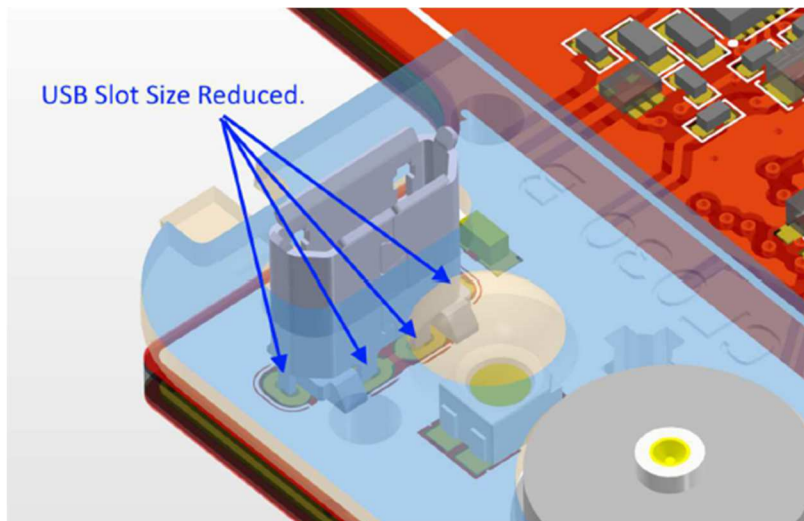


The worst example from the set of 5 is shown below. Possible indication of production variation.

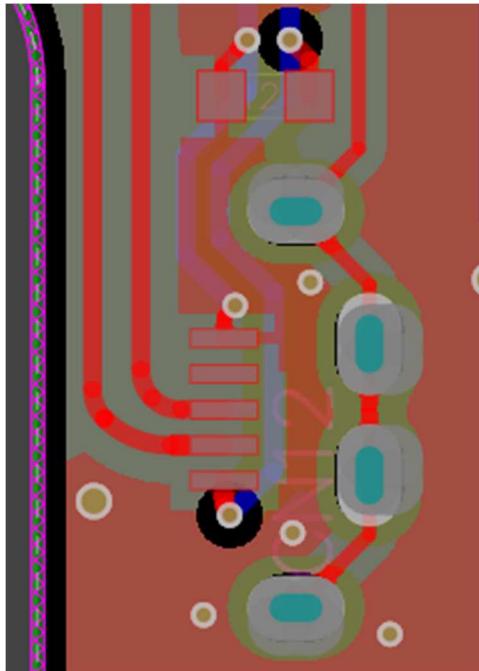


2.1.2 USB CONNECTOR SOLDERING

The same USB connector footprint update on the remote was applied to the MC. The changes were to improvement alignment and to increase solder fill.

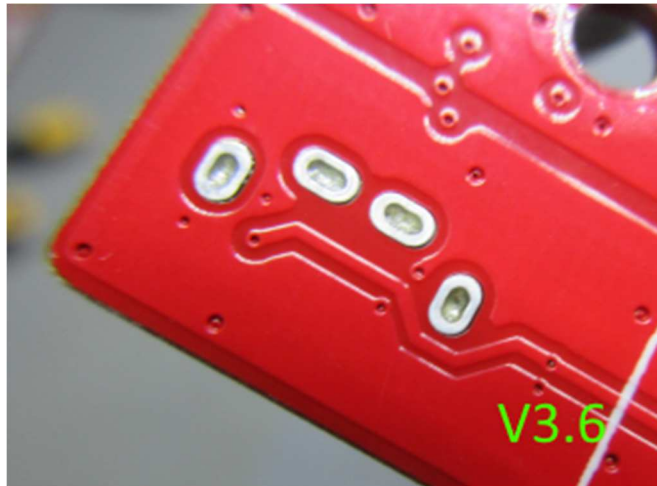


The paste geometry update as shown below. Paste increased beyond mask perimeter for chassis pins.

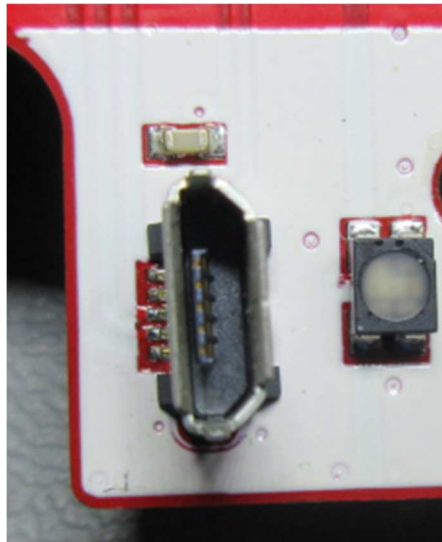


The improvement in solder fill is quite noticeable. Below shows V3.5 in comparison to V3.6. This may both improve USB connector retention/strength as well as make Jesse happy.



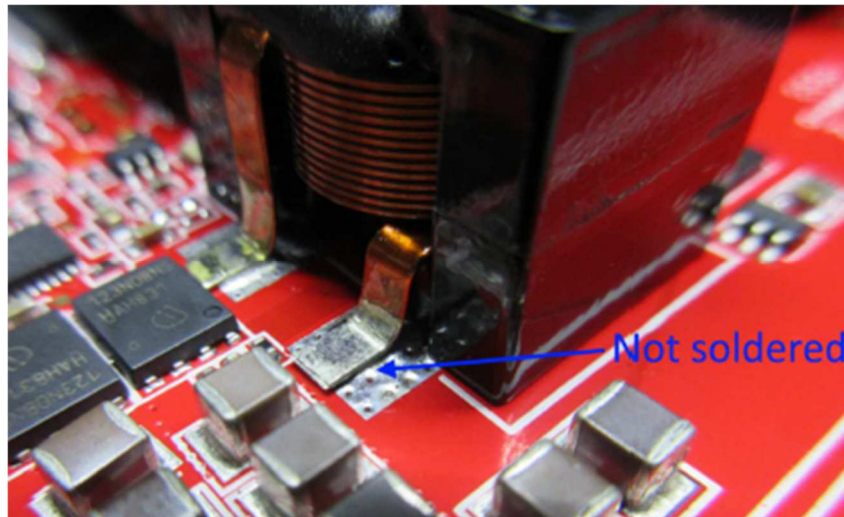


All USB connectors are well aligned.

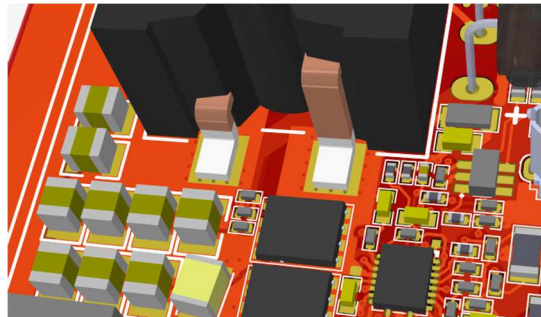


2.1.3 INDUCTOR L3 SOLDER MASK CHANGE

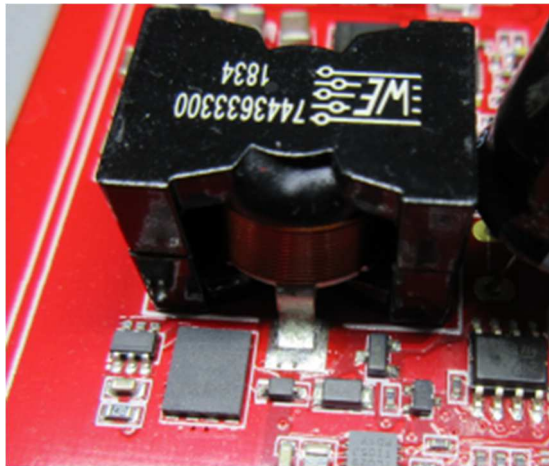
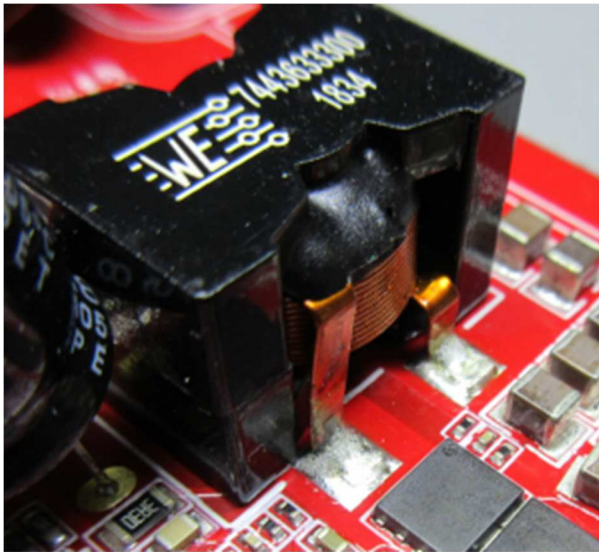
Several prior production faults were due to soldering issues with the large battery charger inductor. Both joint and inductor mis-alignment issues. Footprint used was as specified by the manufacturer.



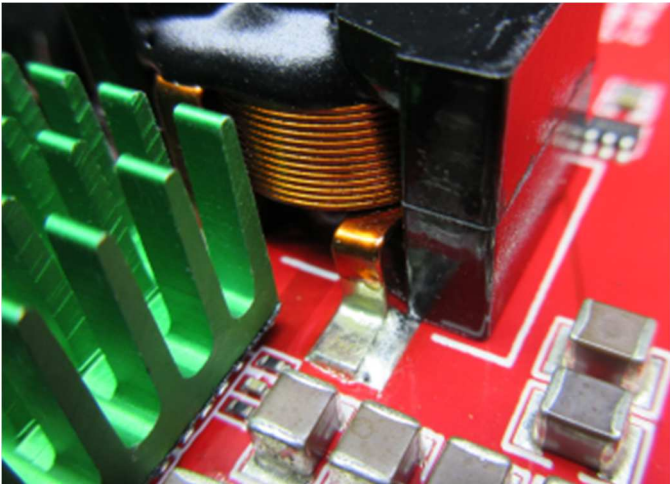
The PCB footprint design was updated with a reduced mask area, while maintaining paste beyond mask perimeter.



Significant improvement in solder fillet/volume observed. Change most evident.



Worst case example below. Mis-alignment considered minor.



2.2 SAMPLE INSPECTION

2.2.1 FFFFE022

Right VESC has a motor start issue. Jolts from certain phase angles.

Resoldered many joints, no impact.

Re-flashed firmware.

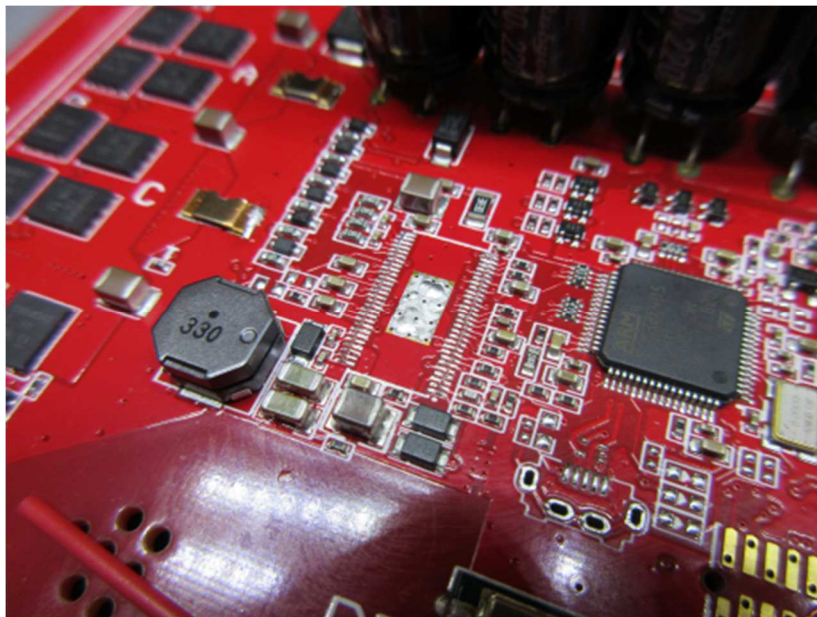
Checked bridge commutation signals. Clean.

Checked bridge gate signals. Clean.

Drives motor under load.

Engaging brake causes jolt and no brake for a period.

Replaced bridge driver, no change.

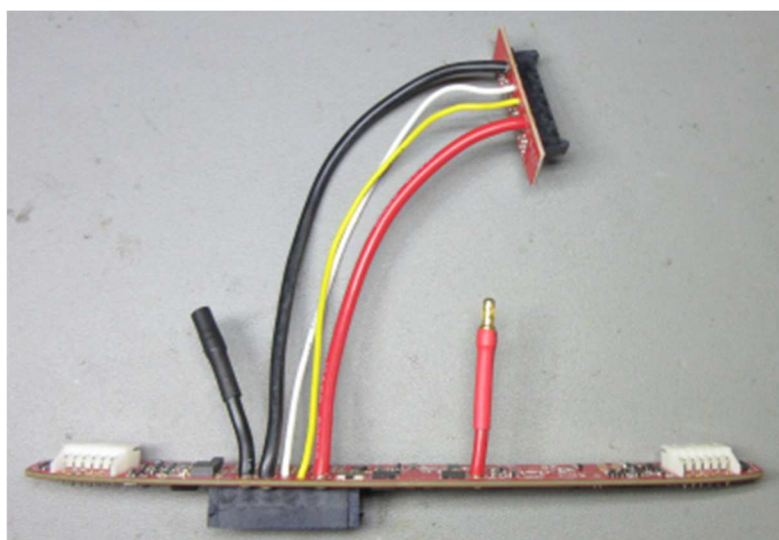
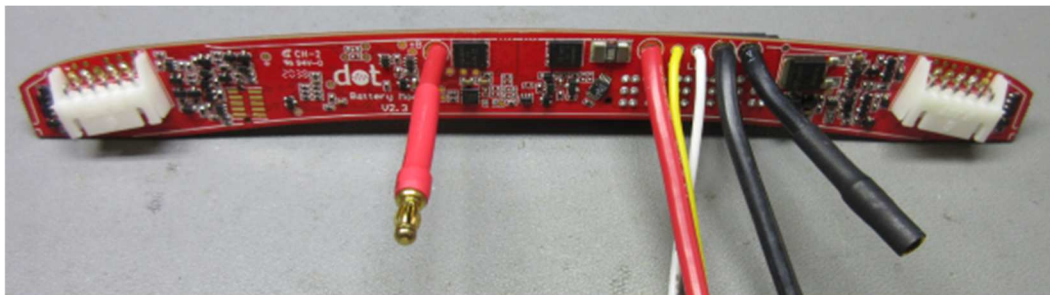
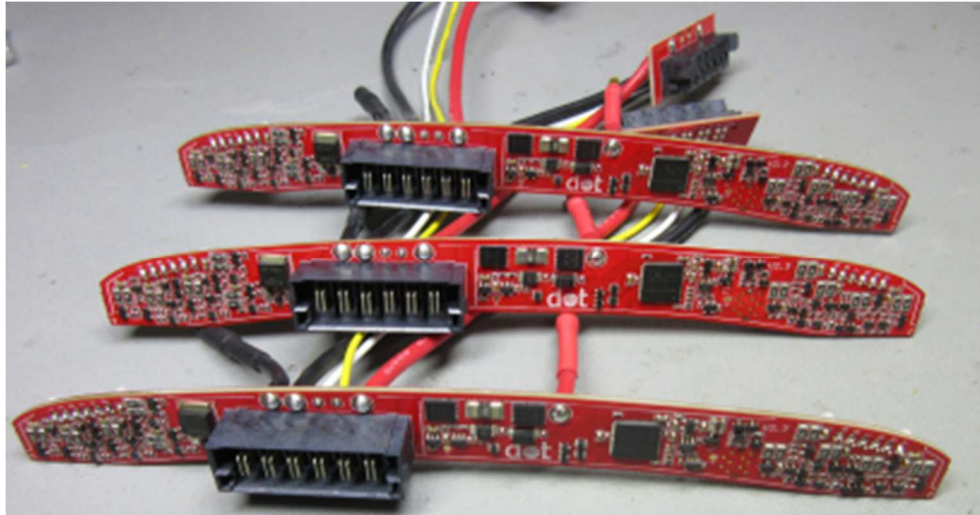


Log file captured right VESC over current fault.

Fault not yet determined.

3 BATTERY MODULES

3.1 PCBAS

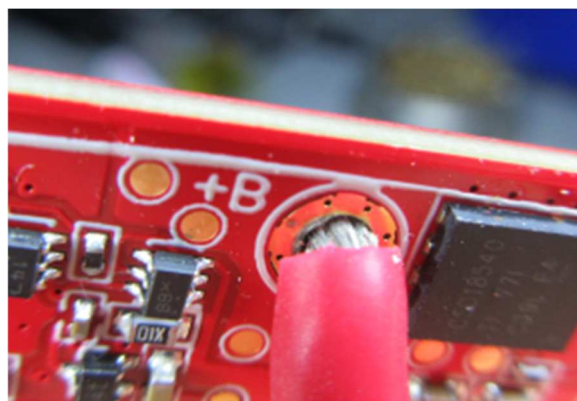
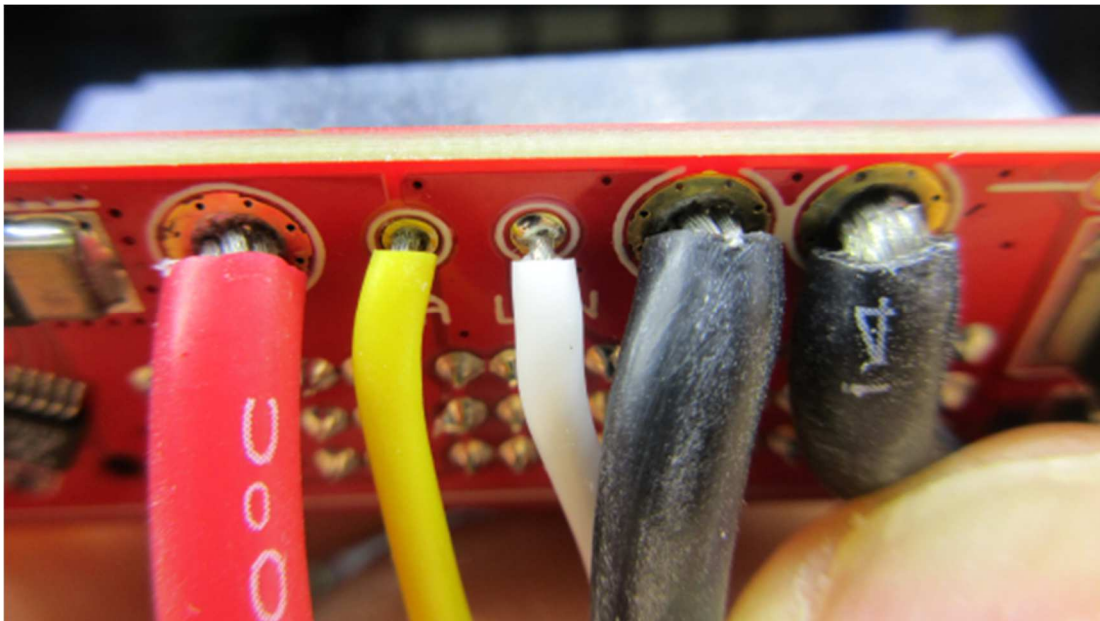


3.2 WIRE SOLDERING

The wire soldering has historically not been at the desired level, however has never been a functional issue. The wiring holes were increased slightly at Unions request to improve the through hole fill and filleting on the opposite solder side. The land area was also increased slightly.

The through hole is getting sufficient fill for the functional requirement. Operator soldering speed is likely pushed too fast. Hot air pre-heating would also be preferable.

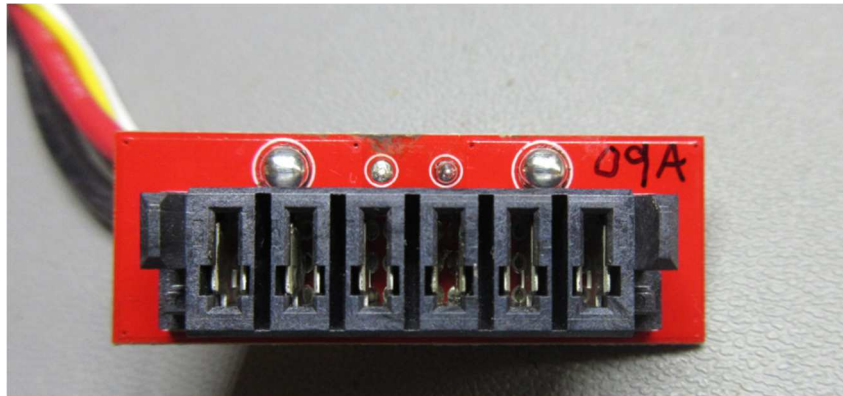
Although still not at the desired level, there is no historical functional issue to pursue further changes.

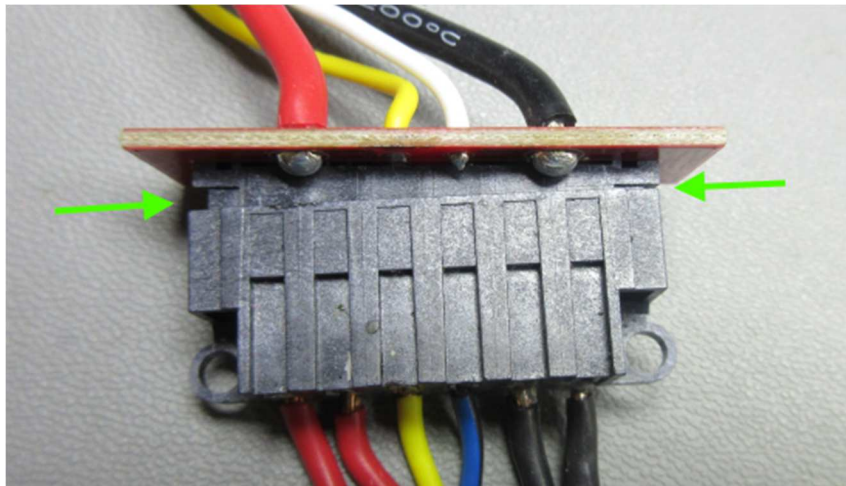
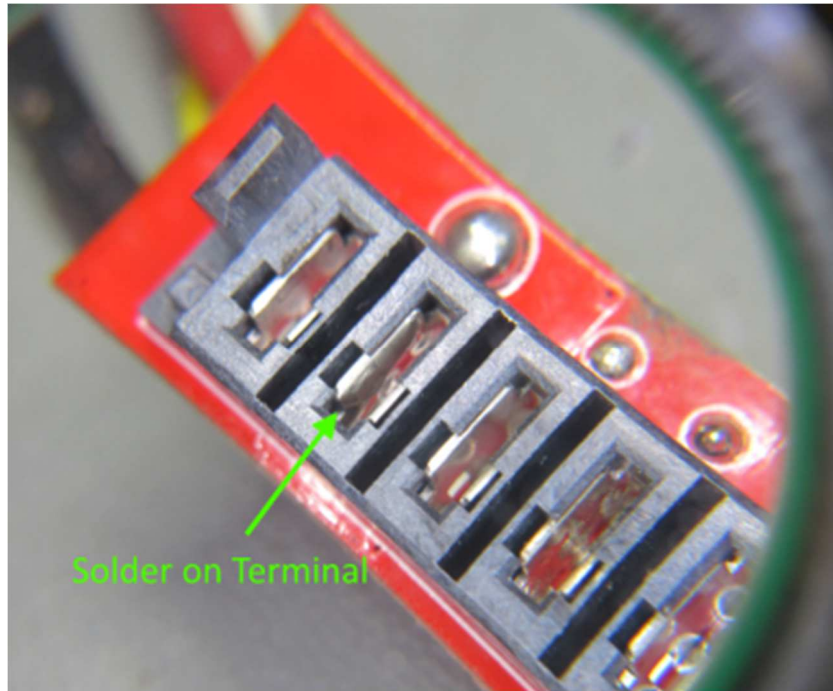




3.2.1 BBBB009A

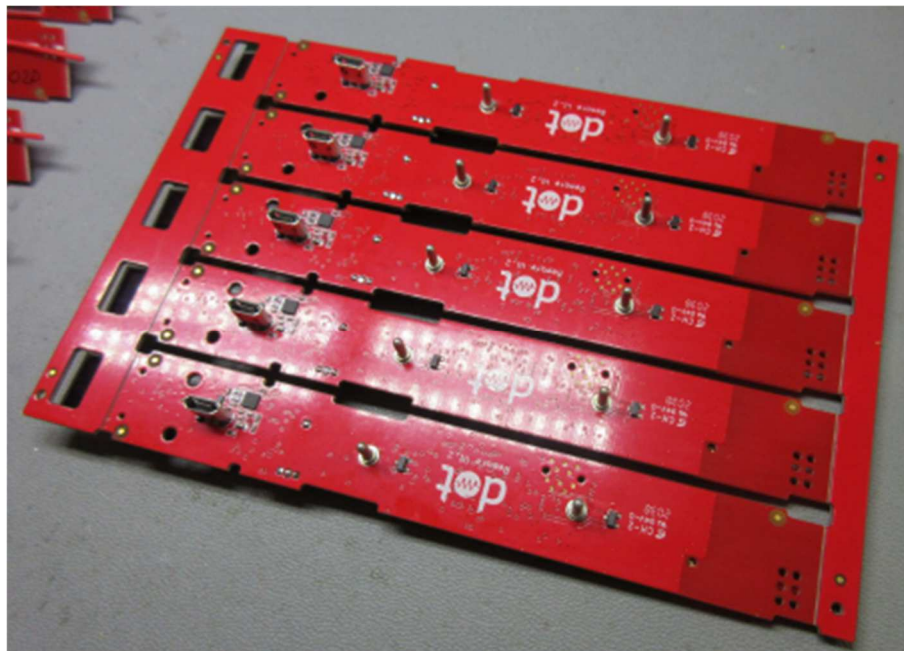
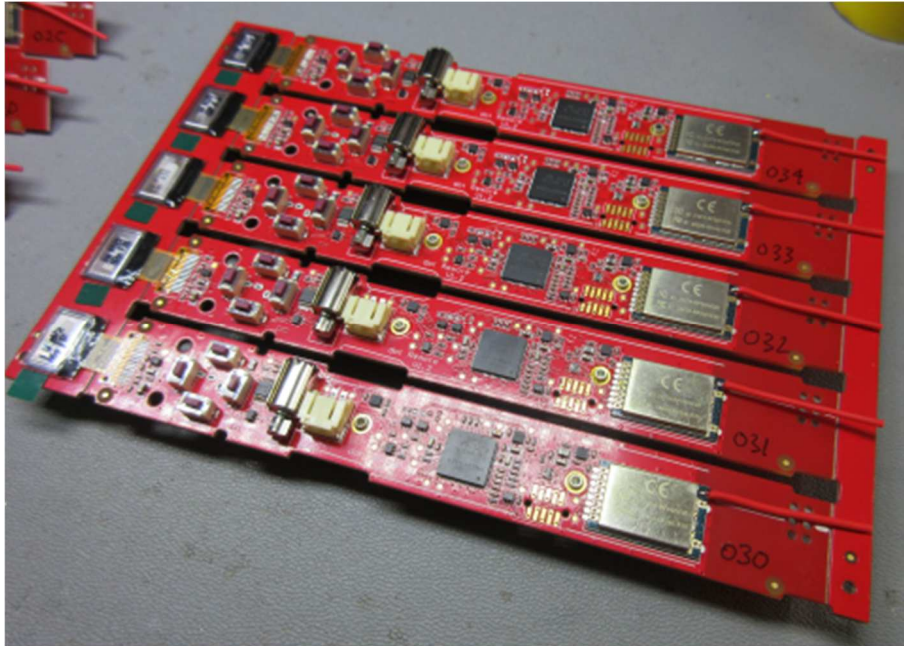
Inspection found the front connector to have solder wicked into terminal contact. This causes a fitment issue for full connector mating.





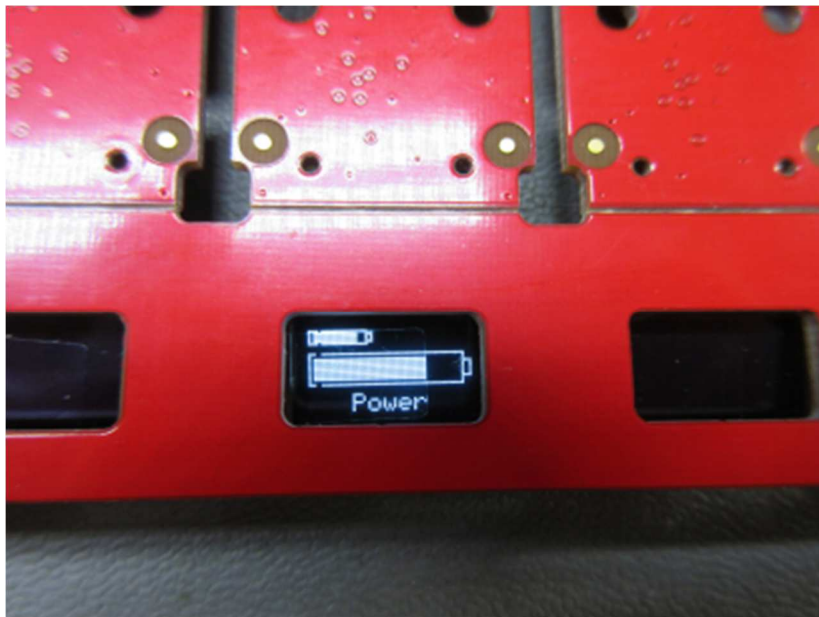
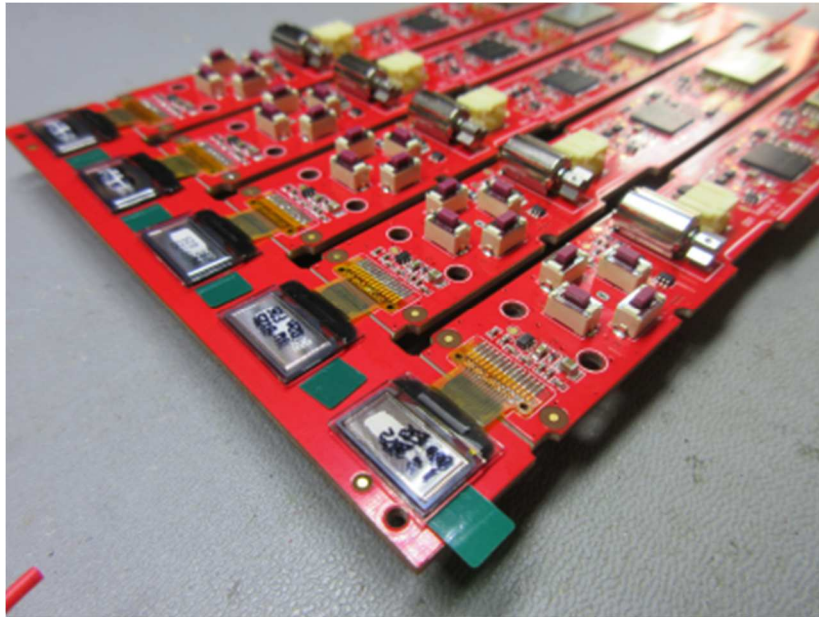
4 REMOTE CONTROL

4.1 PANEL UPDATE



4.2 OLED PROTECTION

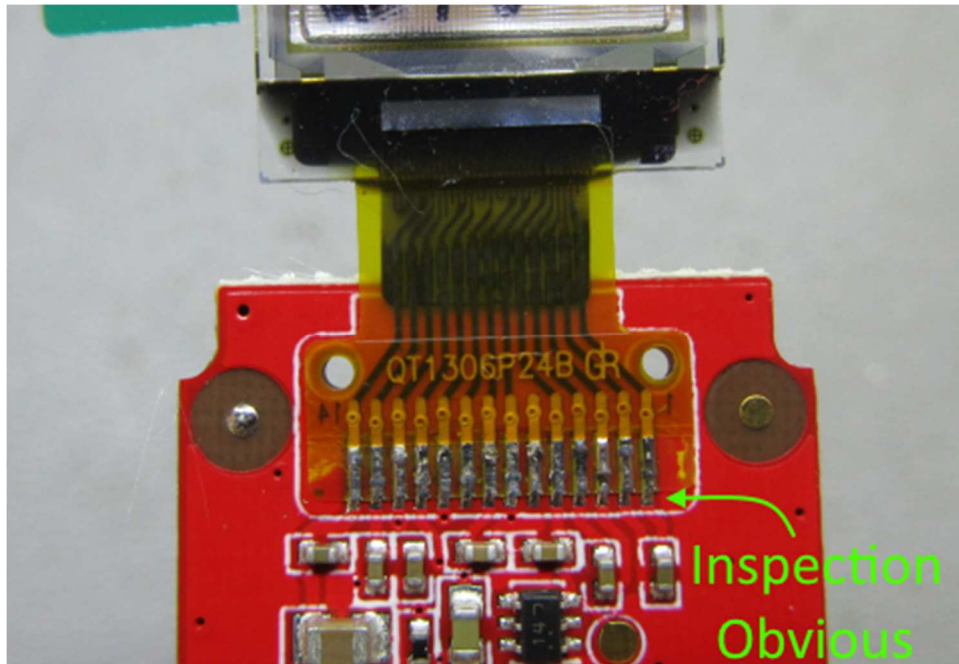
OLEDs have the desired additional support for handling and shipment.



4.3 OLED ALIGNMENT HOLES

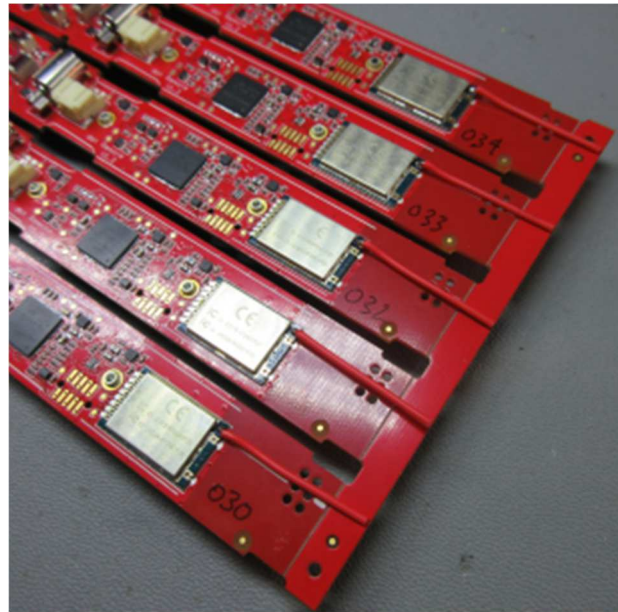
OLED alignment holes moved 0.25mm and increased to 1.1mm diameter. This is to improve tab soldering inspection and jig alignment fitment.

Samples would have been prepared without a jig for alignment, which is noticeable. Given due consideration, change gives the desired obvious soldering edge inspection.



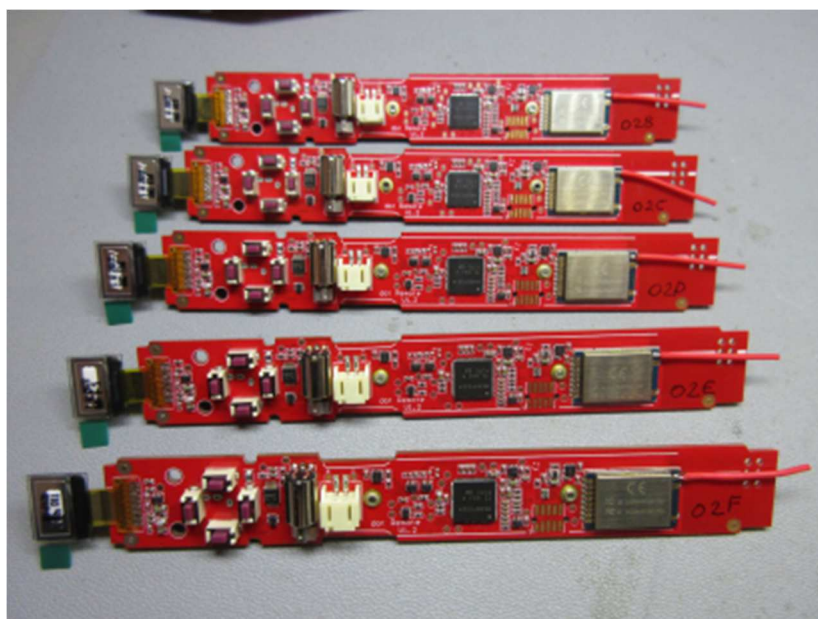
4.4 ANTENNA PROTECTION

The extended panel breakoff is just enough to avoid a lot of antenna displacement while handling and being packaged.



4.5 DE-PANELED

De-paneling easy. The OLED end should be broken off without touching the OLED.

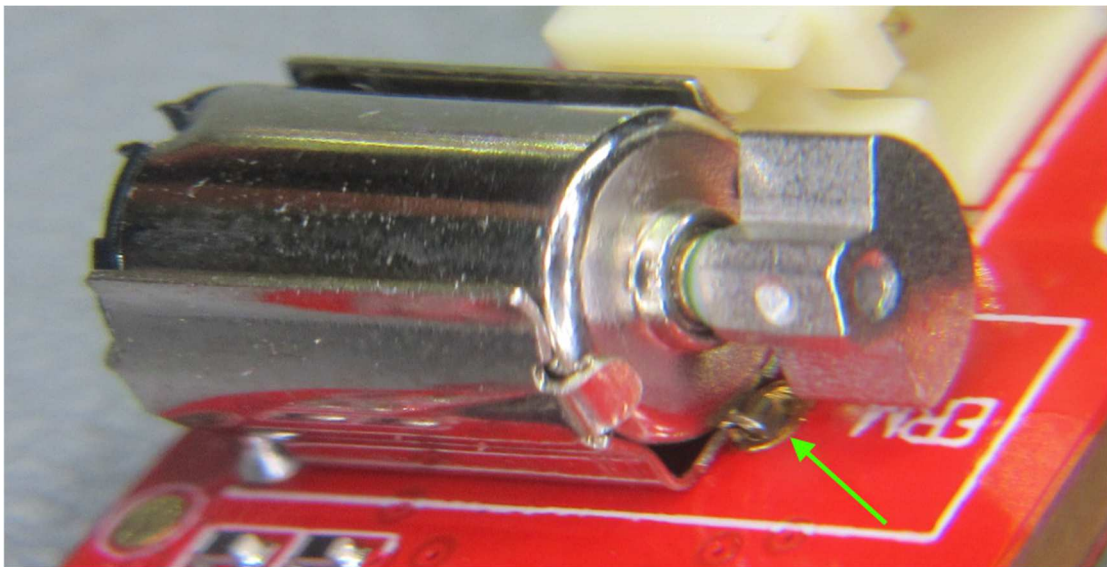


4.6 PRIOR ISSUE INSPECTION

4.6.1 ERM SOLDERING

The soldering to the ERM frame pins is still insufficient. The PCB design was tweaked to provide more thermal relief and a greater opening. Those holes were changed to slot to improve solder flow. The likely soldering issue is more related to the short length of the pins, along with the high thermal bleed to the chassis.

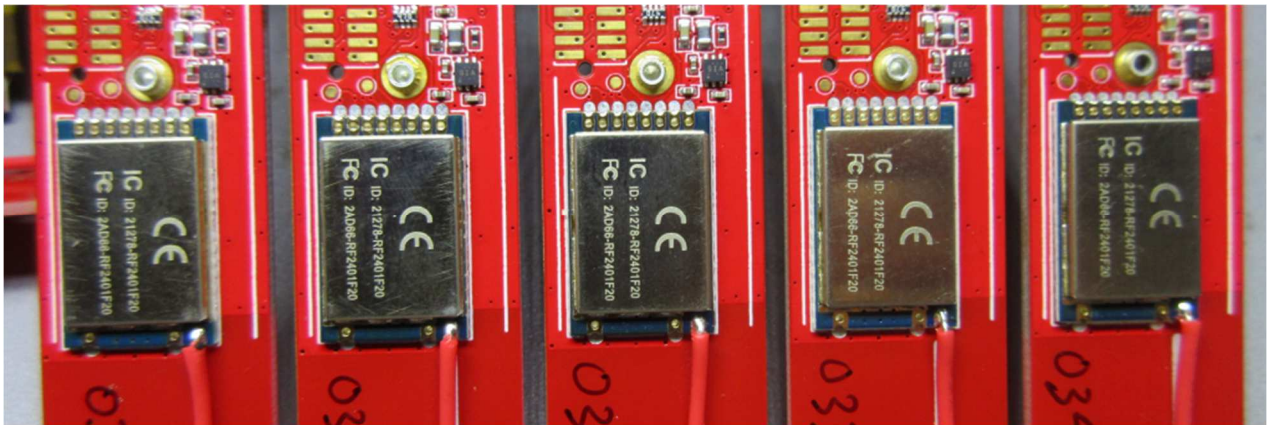
The pins to the electrical connections have significantly less thermal bleed. The soldering is good, although one was borderline. Given production history, there should be no reliability concern given the ERMs are continued to be glued to the PCB.





4.6.2 WIRELESS MODULE ALIGNMENT

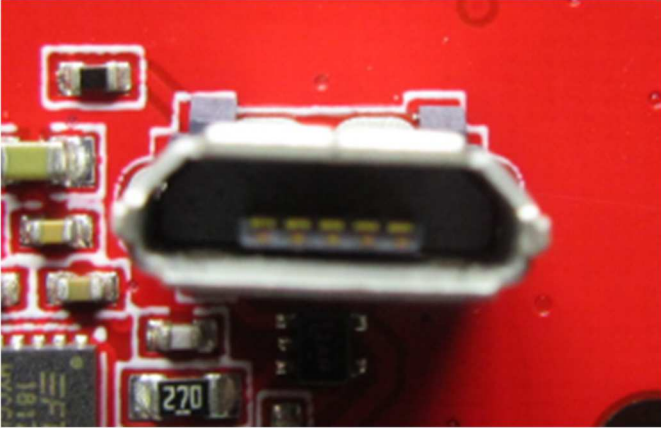
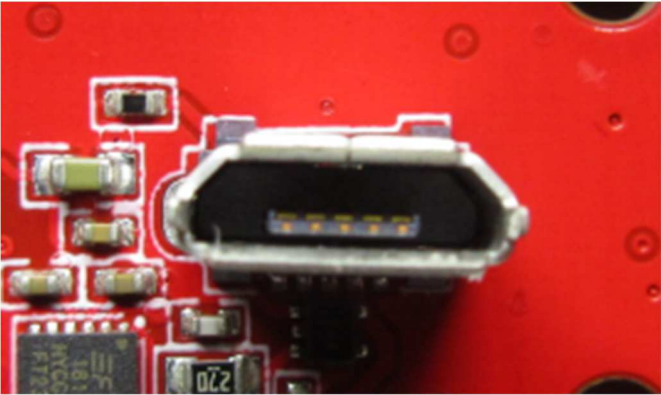
Reflowed alignment is good.



4.6.3 USB CONNECTOR ALIGNMENT

7 units had very good USB connector. The 3 below were not ideal.

Units FFFF030, FFFF02C (worst example), FFFF02D.

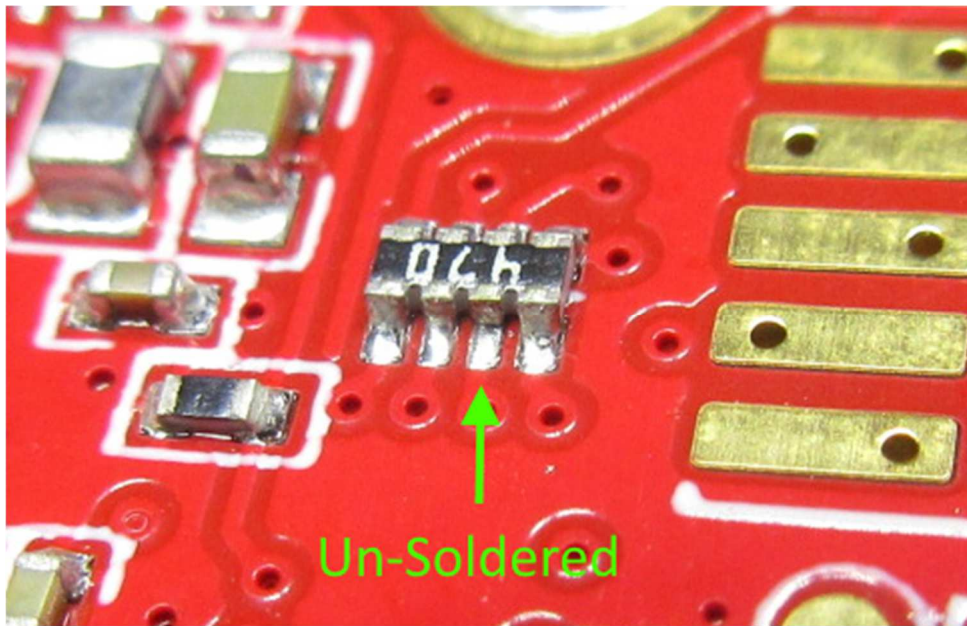


4.7 REMOTE SAMPLE INSPECTION

4.7.1 FFFFF02B

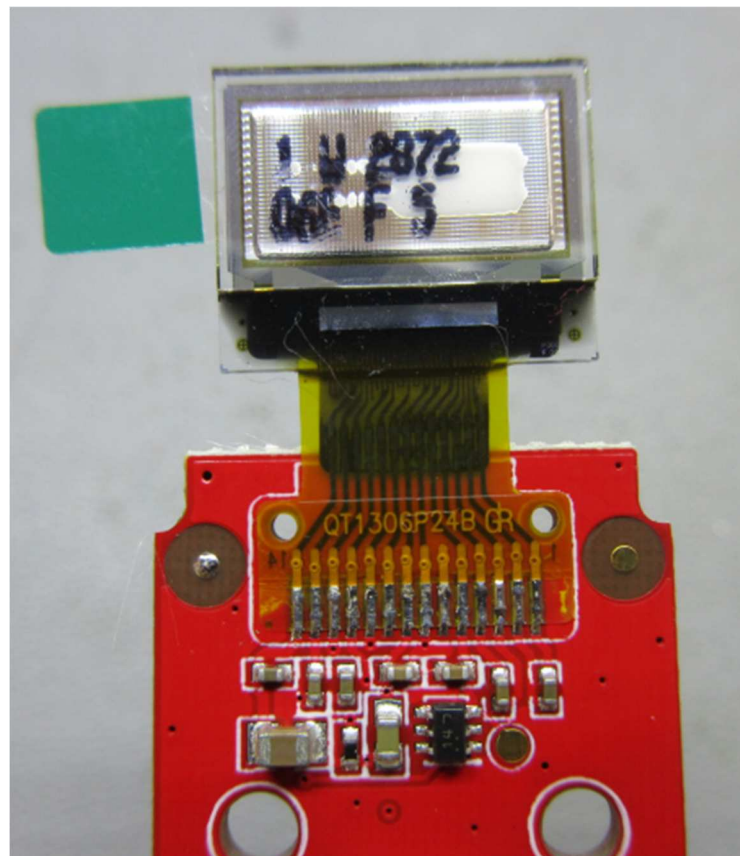
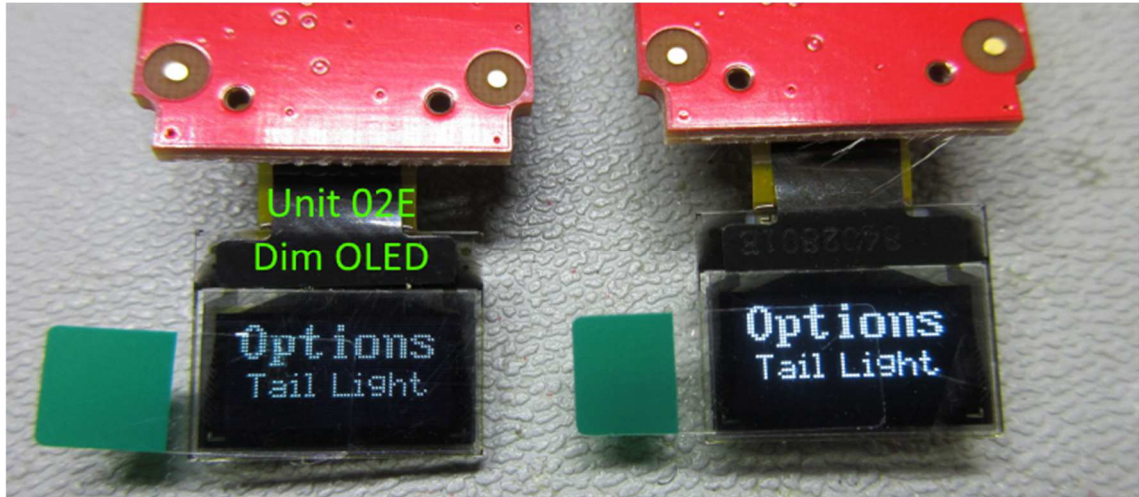
Wireless not functioning.

Found R25 with un-soldered contact.

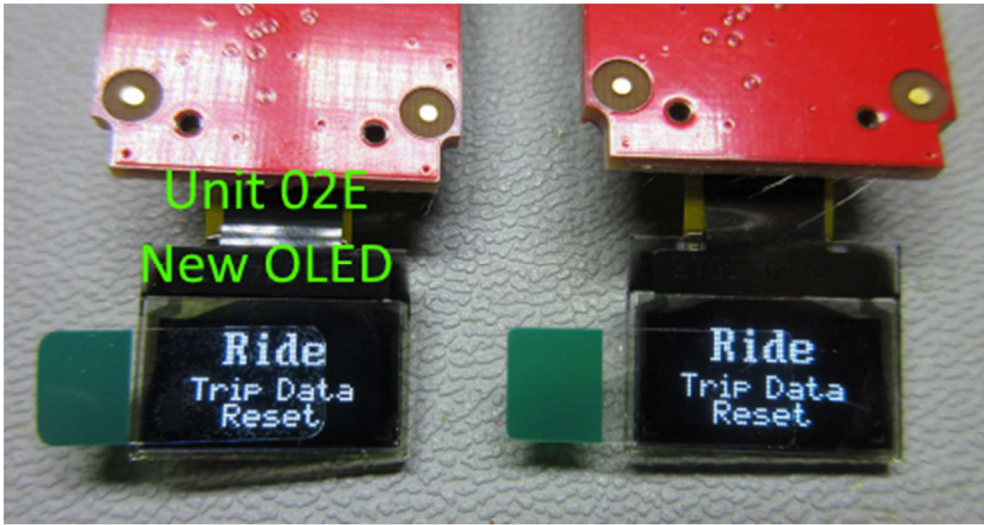


4.7.2 FFFFF02E

OLED Dim.

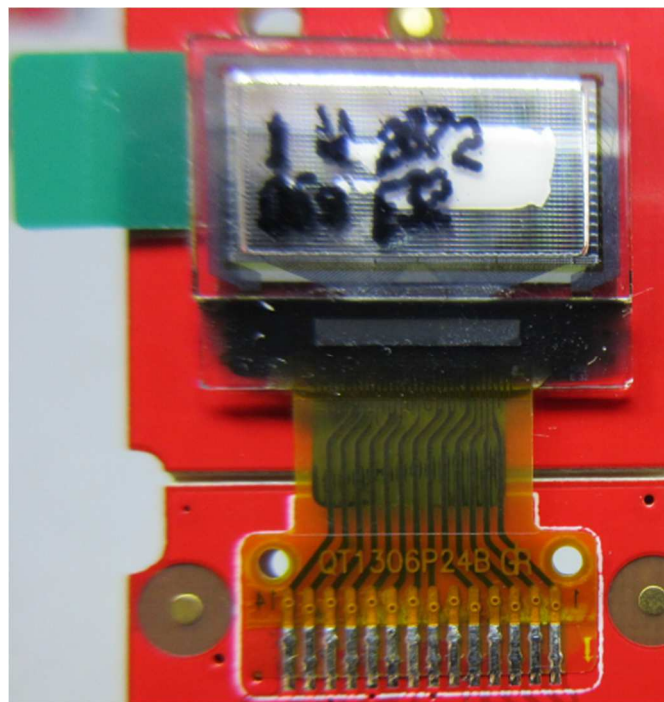
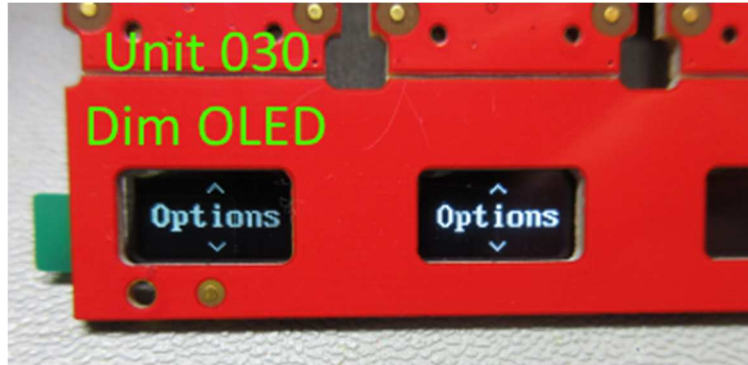


Replaced OLED. Brightness correct.



4.7.3 FFFFF030

OLED is dim.



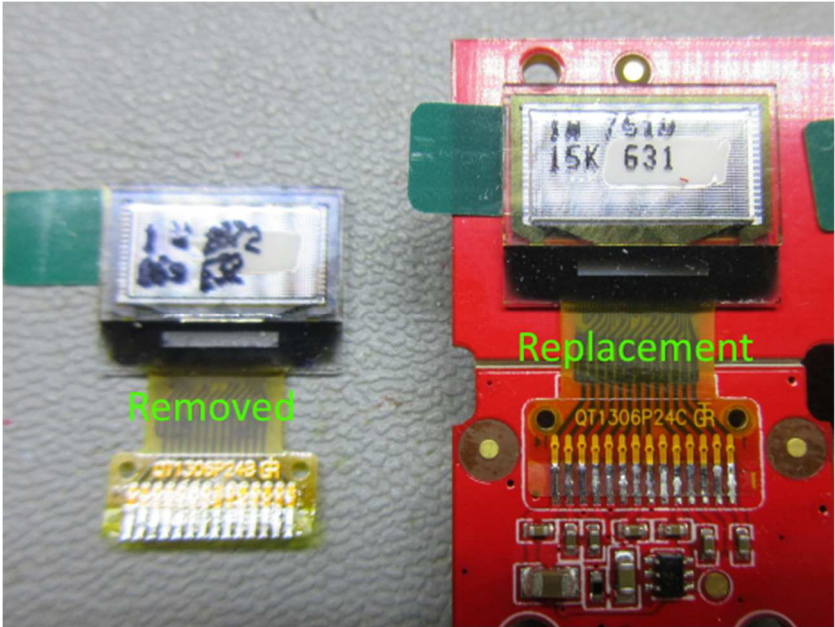
Re-soldered tab with flux. OLED is still dim.

Measurements

- VCOMH = 7.49V
- VOLED = 4.02V
- VDD = 2.498V
- C1 = 1.42V
- C2 = -4.45V
- IREF = 4.70V

Replaced OLED. Display brightness as expected.

- VCOMH = 7.49V
- C1 = 1.29V
- C2 = -4.58V
- IREF = 4.68V





<end of report>