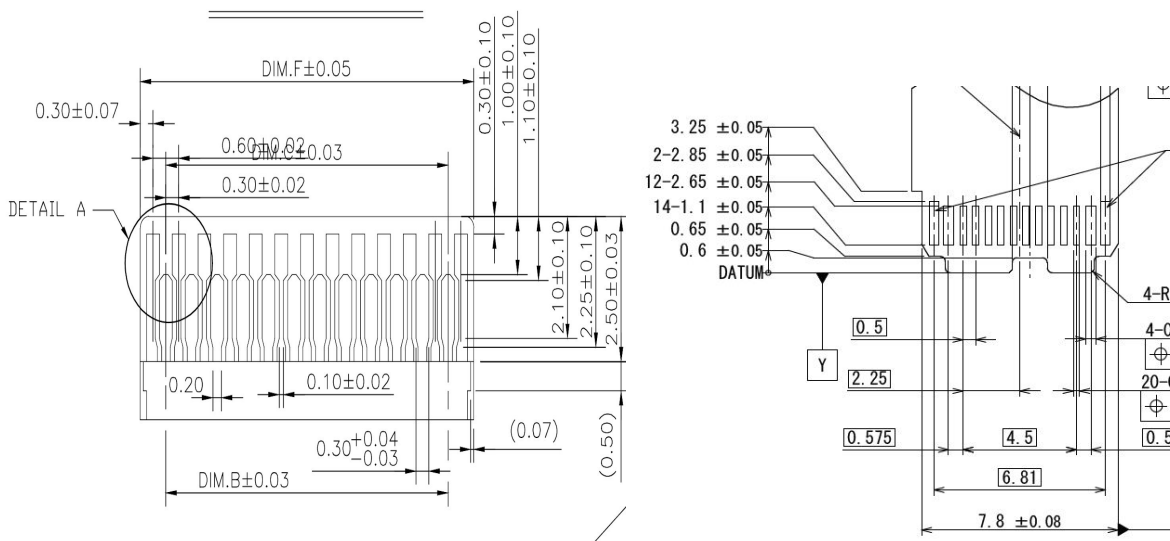


USB Power Delivery Cable PCBA, 2020

Prototype	Bring up	Firmware	EVT	Mass Production
X	X		X	X

Very small form factor PCBA integrated into a cable assembly to convert an existing 10W battery pack into a USB PD capable source. An ultra small form factor buck regulator, power MUX, and STM32 MCU we're implemented on a non-HDI 15mm x 9mm area.



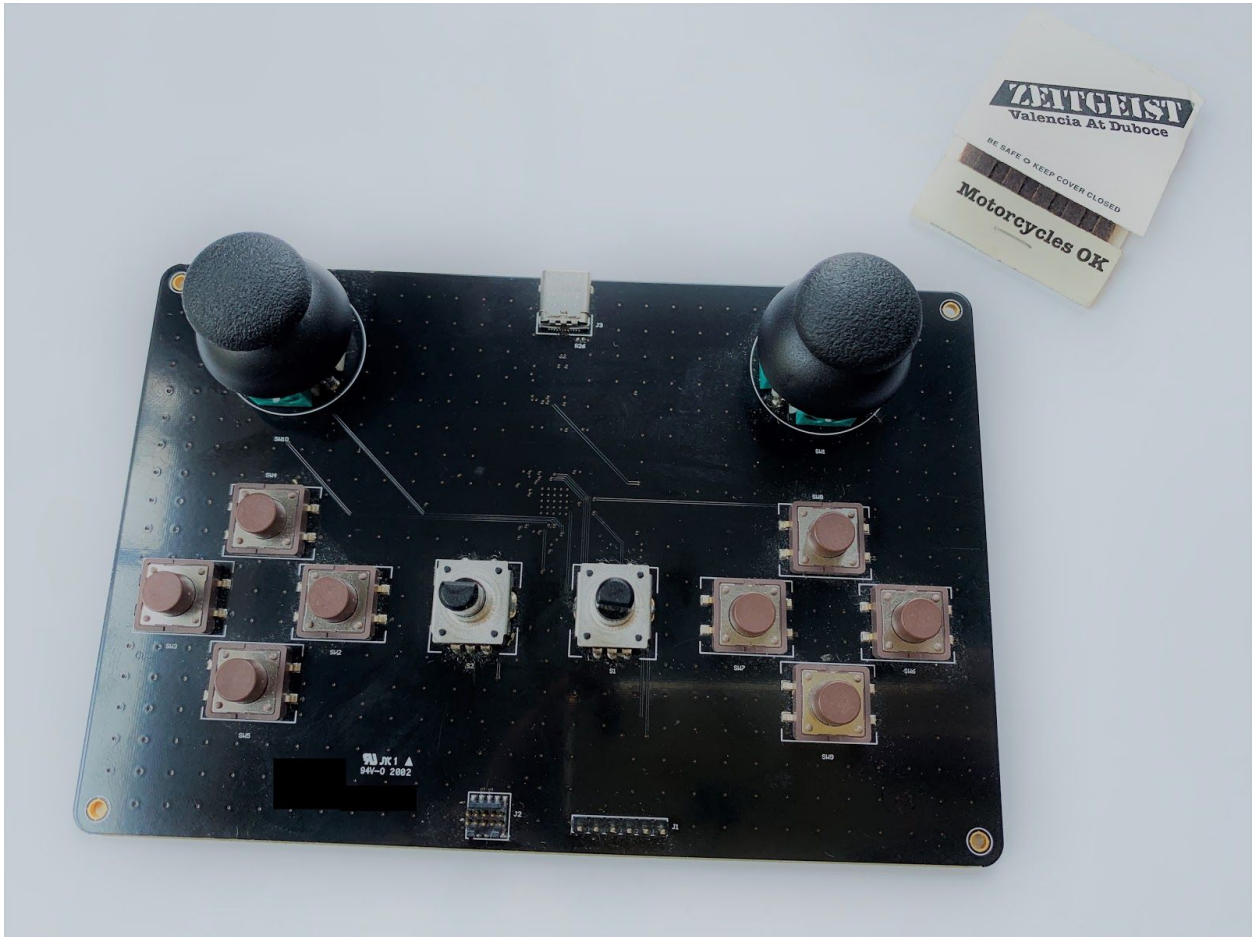


Numerous USB 3.2 Superspeed FFC cable assemblies, 2020

Prototype	Bring up	Firmware	EVT	Mass Production
X				

Designed three different 10 GBs flat, flexible circuits for integration into space constrained mechanical assembly. Designs were simulated against USB 3.2 specification and fabricated to strict specifications. Photos of these cannot be shared, sorry.



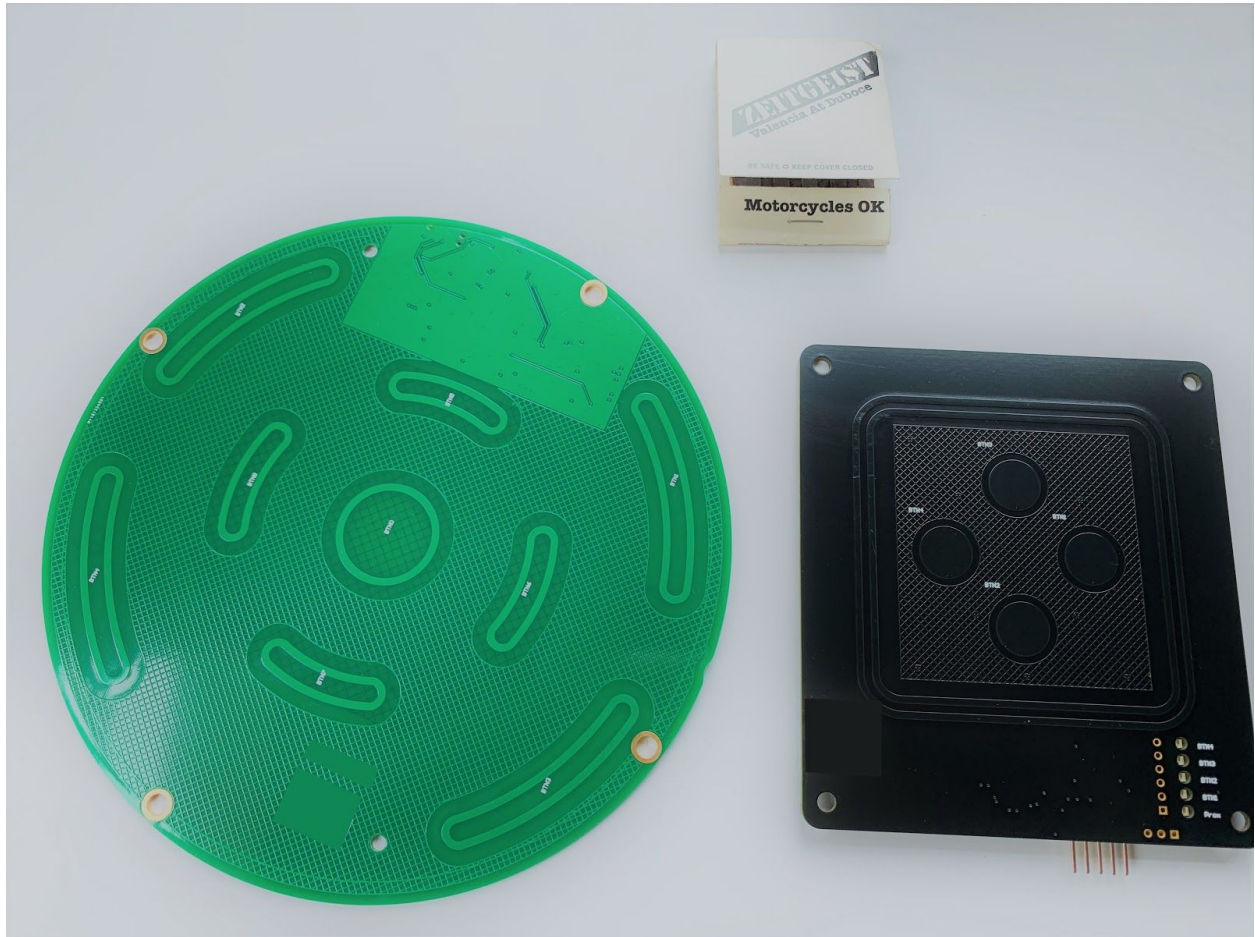


USB HID Game Controller, 2020

Prototype	Bring up	Firmware	EVT	Mass Production
	X	X		

Wrote the firmware for a prototype intended to control a UAS. Performed board bring up, testing, and end to end firmware development on a STM32 based device. Plug it into your USB C capable device and play whatever app supports USB HID game controllers.



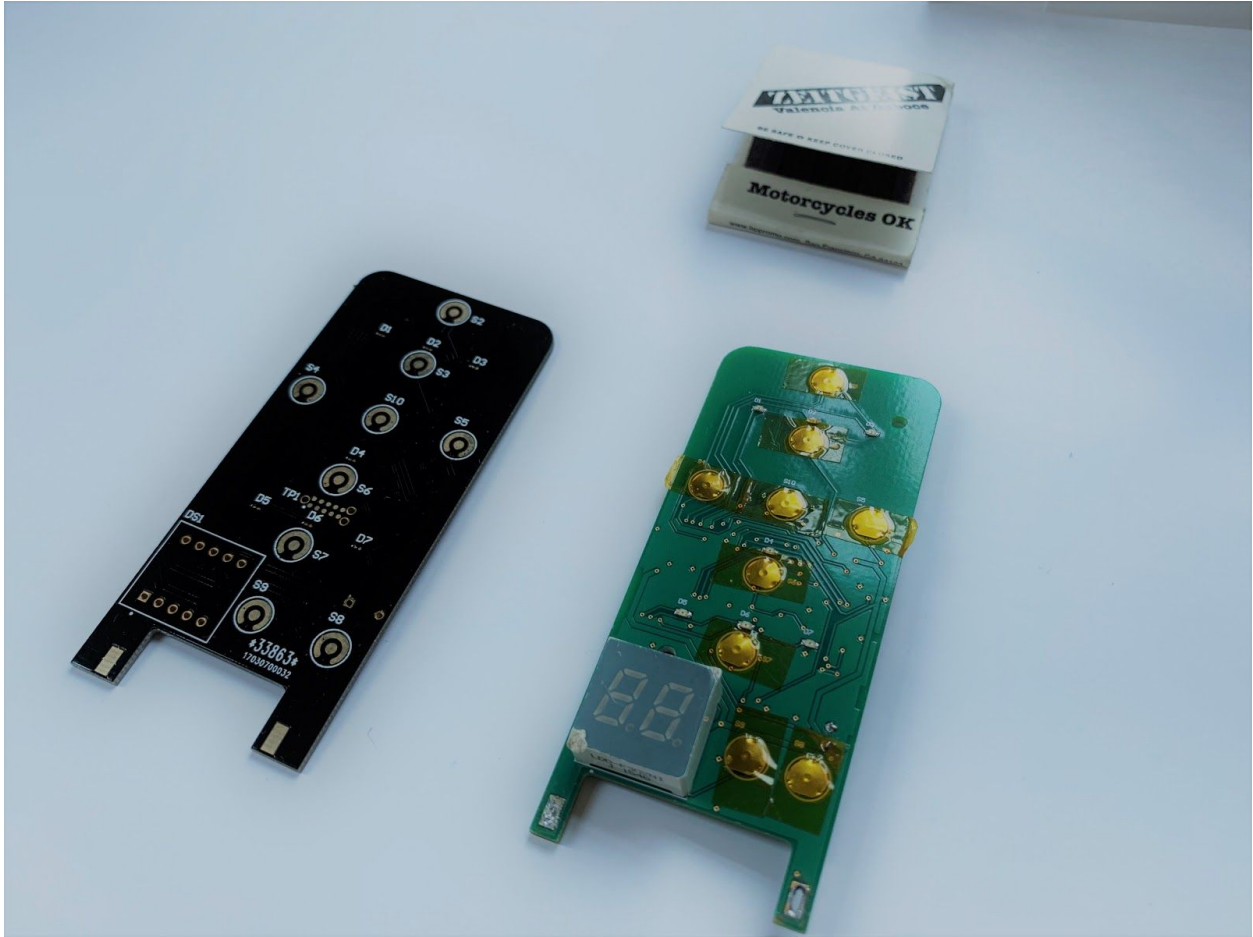


Capacitive Proximity Sensors, 2018

Prototype	Bring up	Firmware	EVT	Mass Production
X	X	X	X	

Responsible for ideation, architecture, component selection, schematic and layout for four different capacitive proximity sensing PCBAs based on evolving product requirements. Rapid iteration allowed for evaluation in various use cases. Capacitive sensor was ultimately integrated into a novel, PoE+ powered device containing a DLP projector (not shown).



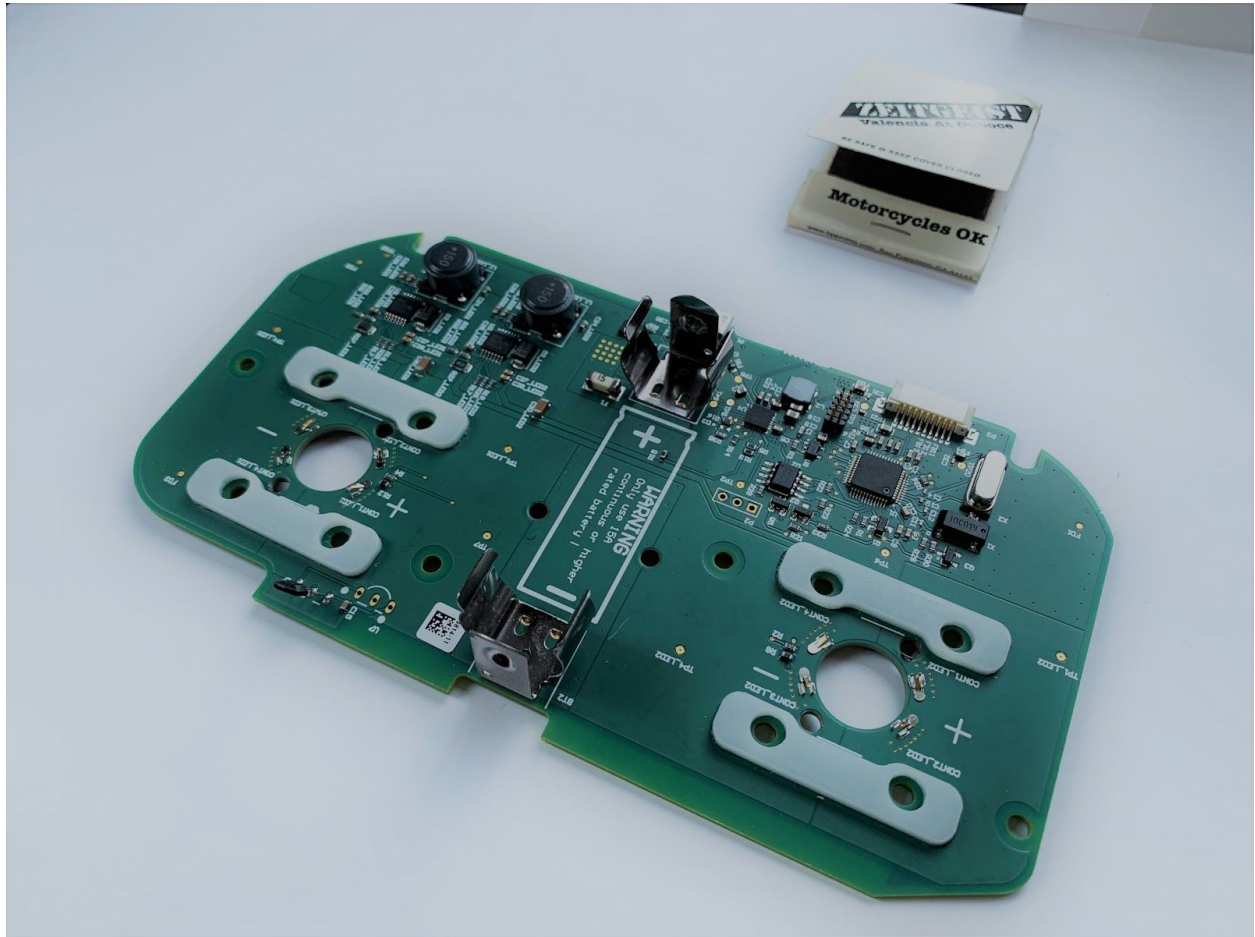


433 MHz Remote Control, 2017

Prototype	Bring up	Firmware	EVT	Mass Production
X	X	X		

Prototype remote control designed to unify 6 existing hardware implementations already in mass production. Design was targeted for ultra low cost, high volume overseas manufacturing for existing high volume OEMs. A custom antenna was designed to reduce costs even further.



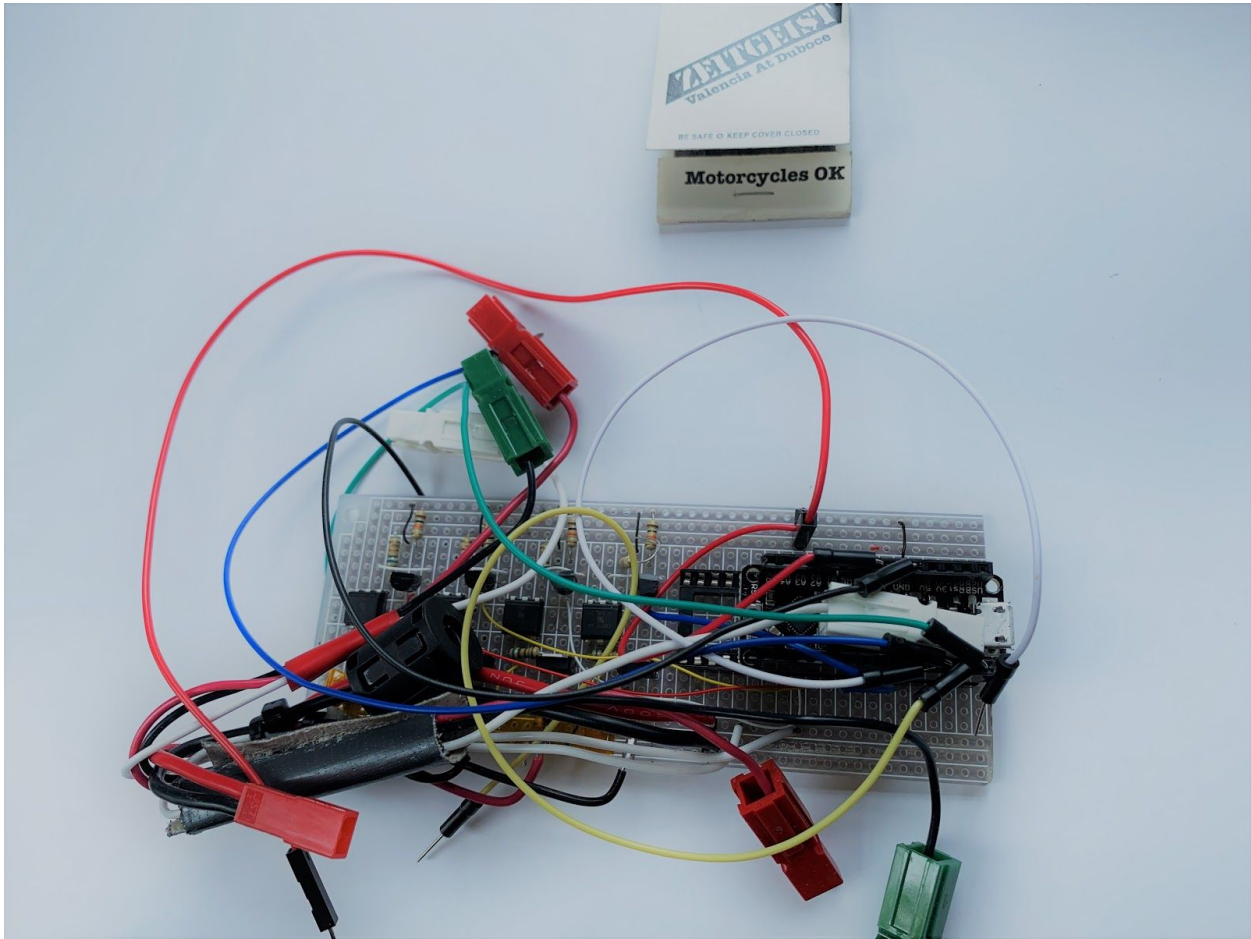


Portable High Power LED Device, 2017

Prototype	Bring up	Firmware	EVT	Mass Production
X	X	X	X	

Cost constrained, high power portable consumer electronic device. Product utilized ~20W of LED power for a 60 second duty cycle from a single 18650 cell. Numerous electrical, mechanical, thermal and cost constraints lead to a challenging but functional design. Partial assembly shown.





Secret Prototype, 2017

Prototype	Bring up	Firmware	EVT	Mass Production
X	X	X		

Hand built prototype electronics to replace failed electronics inside heavyweight Battlebot. The problem was identified through testing of existing, failed circuitry. A new circuit was constructed in 48 hours to test the failure mode hypothesis and validate the proposed solution. A custom PCBA was then constructed based on this design which was subsequently installed and used to greatly improve the robots lethality.



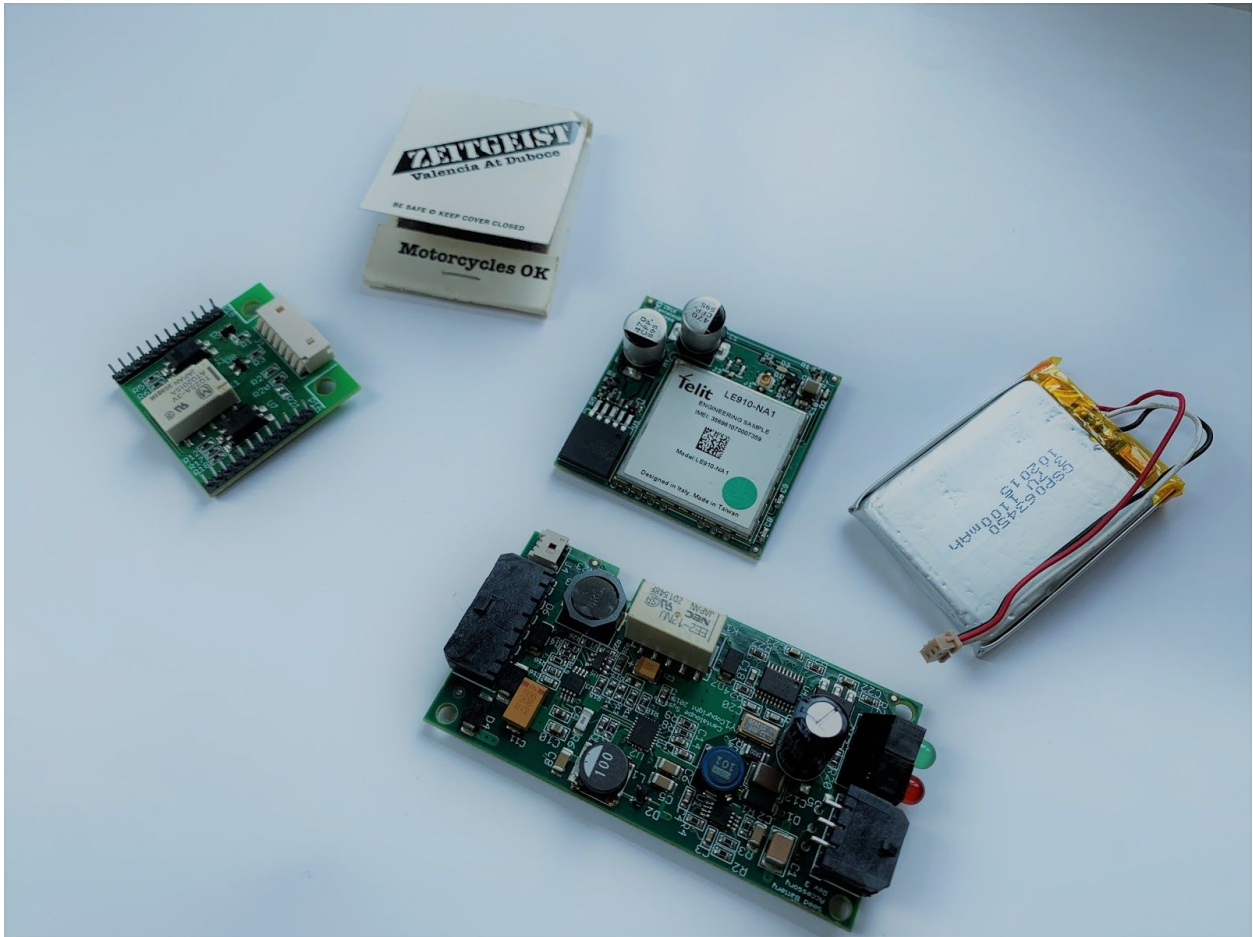


In-ear, True Wireless headphones, 2017

Prototype	Bring up	Firmware	EVT	Mass Production
X	X			

Designed a battery powered, in-ear, bluetooth true wireless stereo headset based on CSR chipset. A custom 2.4 Ghz antenna structure and novel rigid-flex design was prototyped and functional on the first spin of the board. Functional prototypes with 3d printed enclosure shown with attached FFC connector for test and programming.



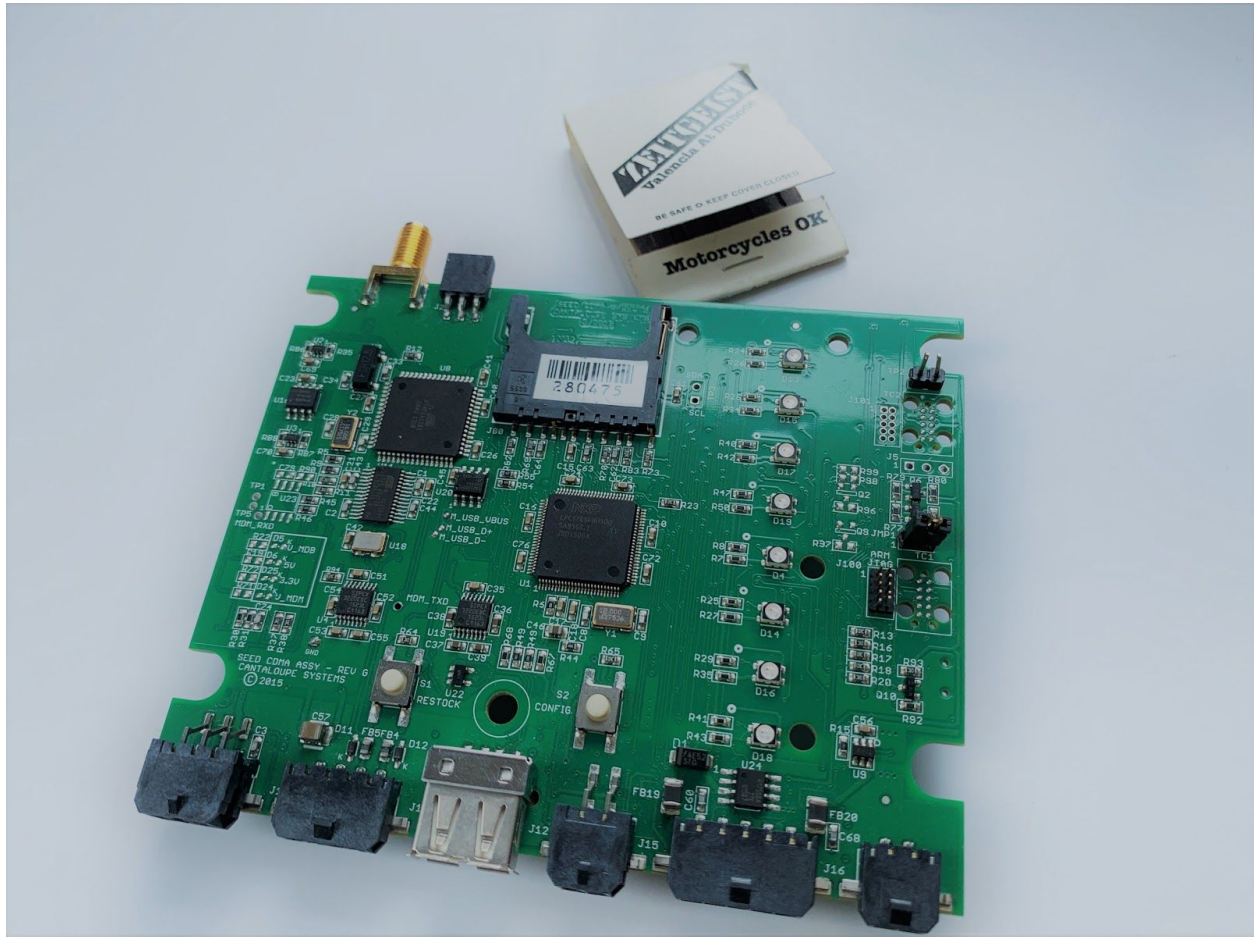


Cellular Product Accessories, 2013–2016

Prototype	Bring up	Firmware	EVT	Mass Production
X	X	X	X	X

Designed various accessories to extend functionality and lifespan of existing deployment of tens of thousands of cellular devices. Accessories included an external battery supply, cellular retrofit module and auxiliary interface board to allow control of high voltage AC motors. Retrofit module added additional years of service for already deployed devices and saved over 10,000 PCBAs from turning into e-waste.





Cellular Product, pre IoT, 2010–2016

Prototype	Bring up	Firmware	EVT	Mass Production
X	X	X	X	X

Involved in initial design and beta test of device. Was ultimately responsible for the specification, design and implementation of the test fixture for product. Product went from 0 units to over 100,000+ in the field globally over ~4 years. Was solely responsible for five revisions of the mature PCBA to maintain manufacturability and product viability as cellular technology evolved.



Additional photos

