Luxonis (2020)

Board Layout for PoE OAK-1

- Contract to take an existing design of their OAK-1 device, upgrade to their larger SOM and miniaturize it.
- PoE (5W), 1000BASET ethernet, PCIE, USB3, MIPI camera module, SPI SD card, debug headers, and 200 pin SOM all on a 4 layer, 60mm x 60mm PCB.
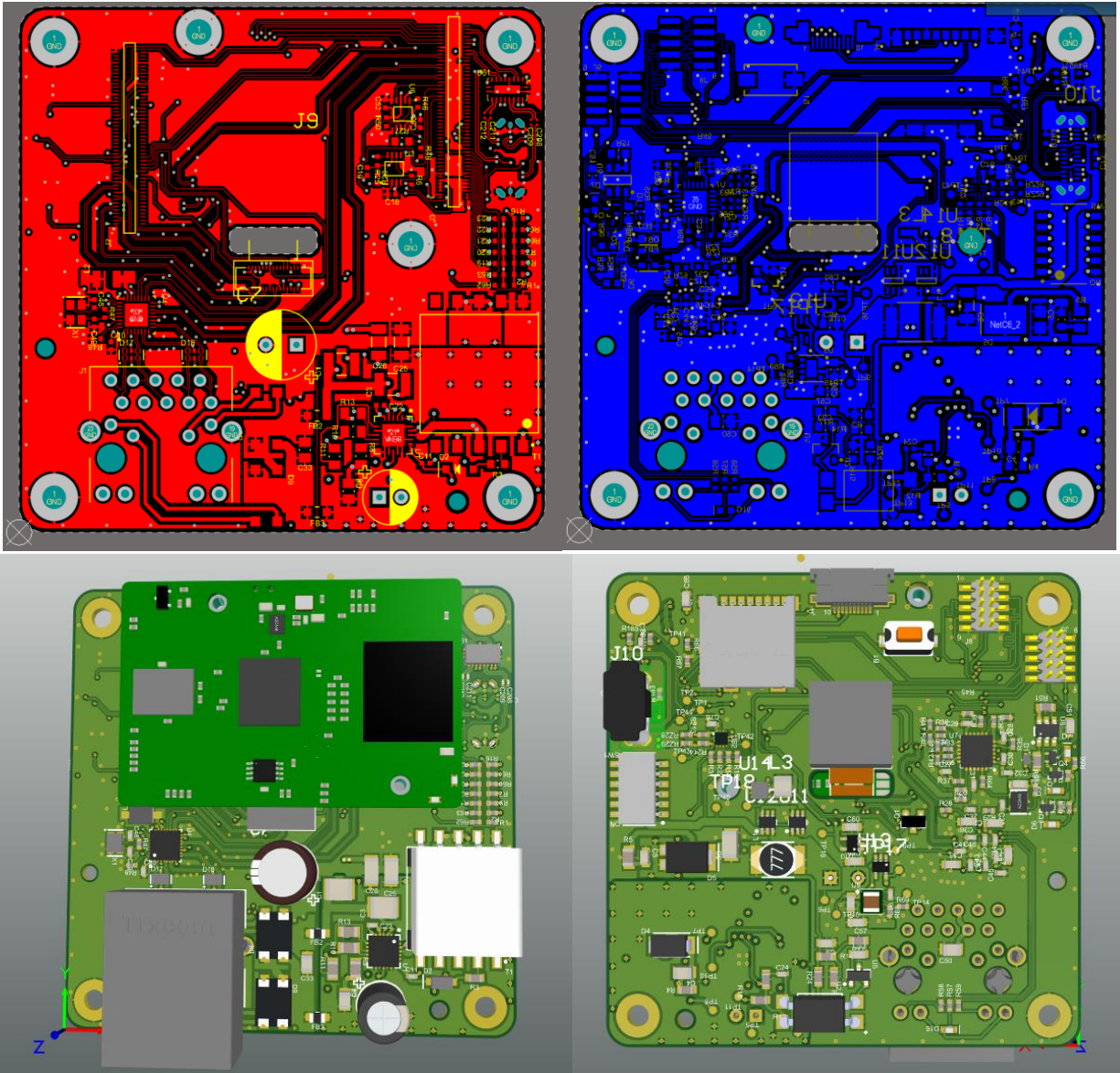
Oto Inc (2019 - Present)

Oto Sprinkler

- Wi-Fi/BLE connected sprinkler that will water exact shape of lawn using software to determine amount of water and amount of lawn solutions to apply
- Designed all electronic hardware (circuits, PCB layout, and cabling)
- 2 motors (radius and angle), 3 pumps (solution), magnetic encoders, solar battery charging, and more
- Quiescent current of 70uA but able to deliver almost 10W of motor power when watering
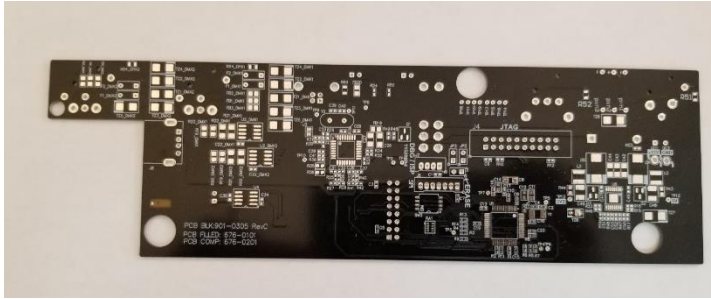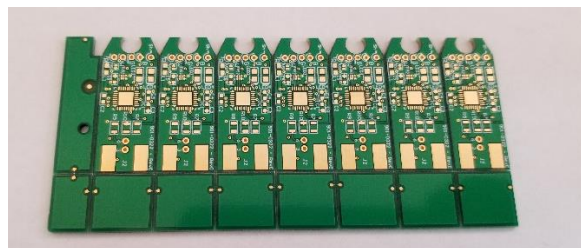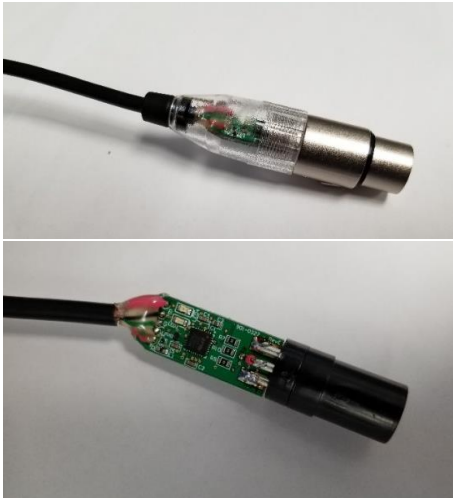- 4 layer main PCB
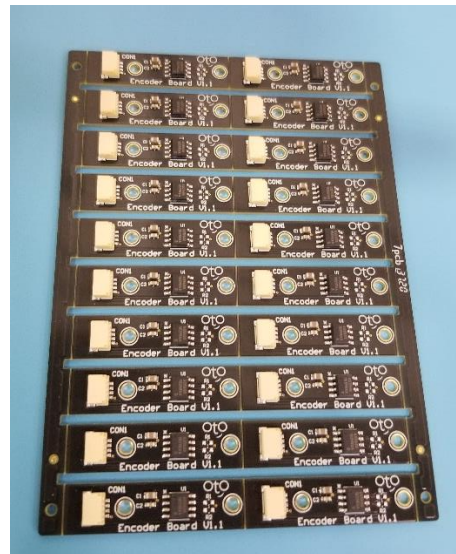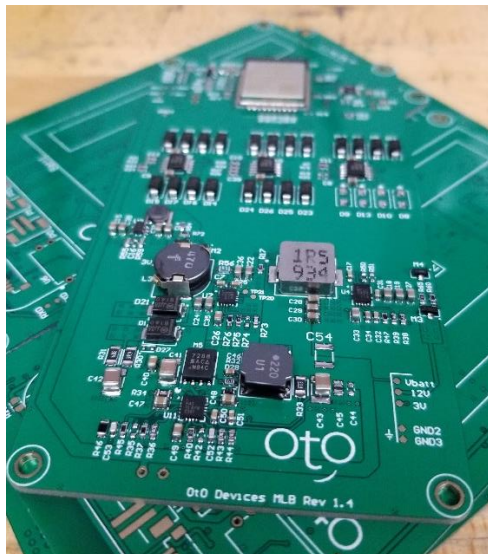
Spectrum Mfg. (2018-2019)

Vista EX – Lighting Controller Main Board

- 4 layer, USB 2.0 high speed (host and device), DMX512 (lighting interface)
- Main PCB interfaces with multiple microcontrollers on panel PCB which has encoders and butto

UD512 – USB to DMX512 Cable (PCB integrated into XLR Backshell)

- DMX implemented by RS485. PCB does the USB to RS485 with an FTDI part
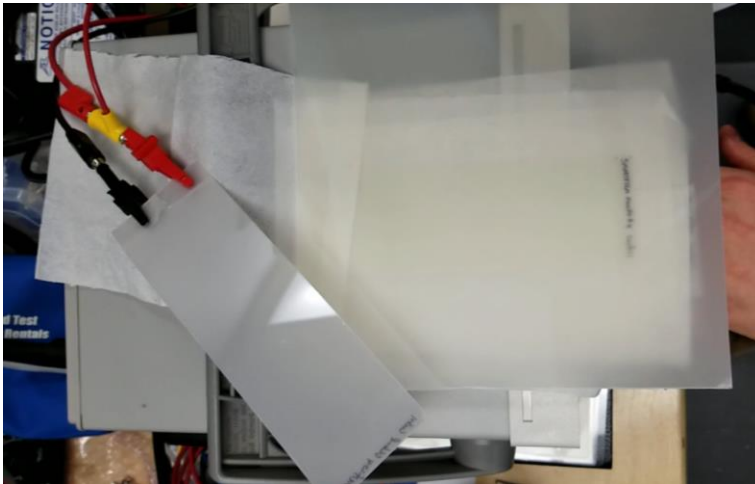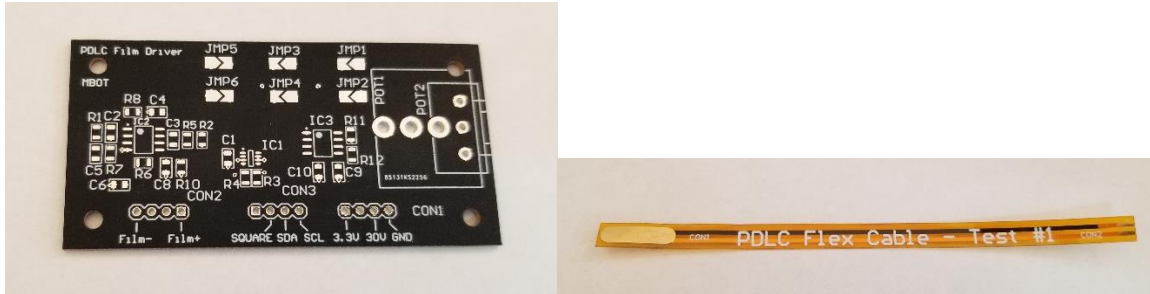- PCB soldered to the XLR connector by squeezing between pins

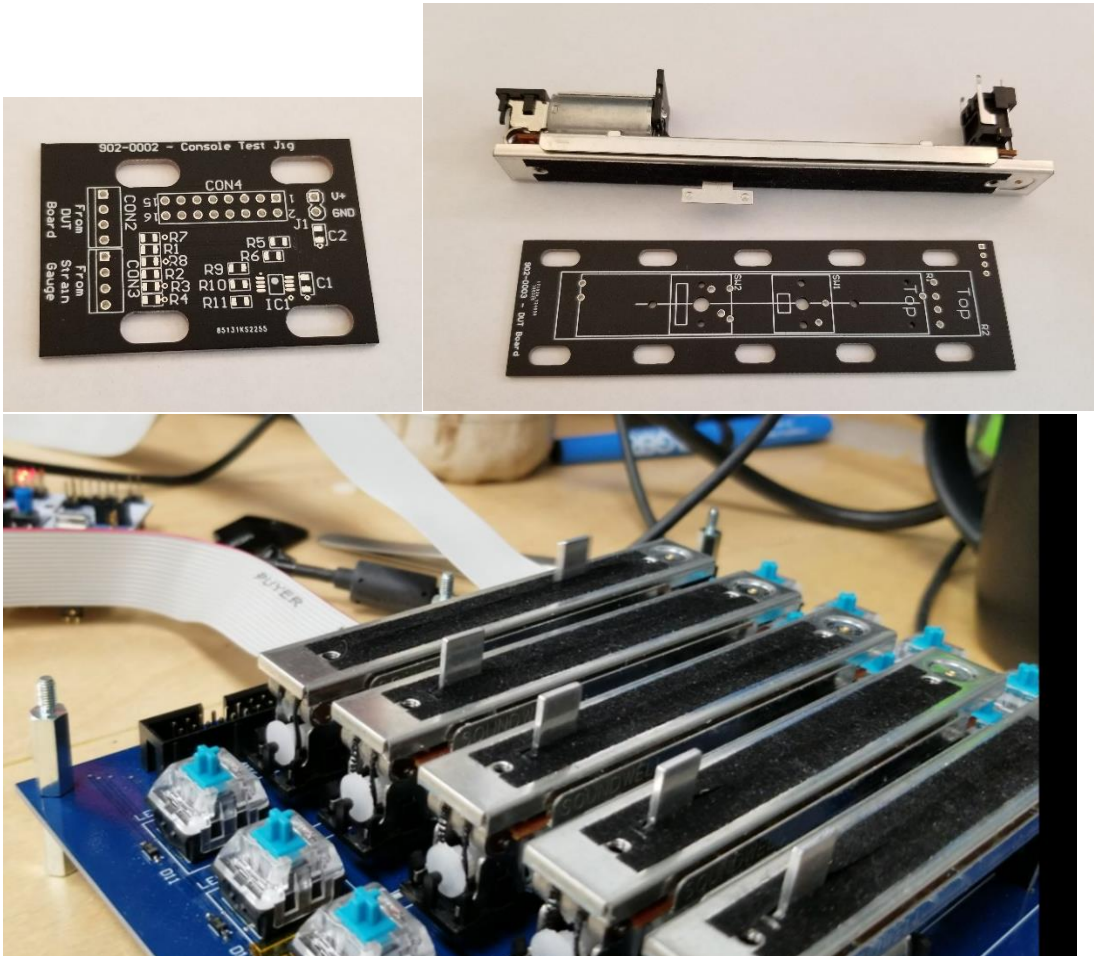PDLC Film Driver (Smart Film/ Polymer Dispersed Liquid Crystals)

- Film that can be electronically controlled to modify diffusion of a stage light (20deg to 70deg)
- Circuit that takes a PWM wave (3.3V-0V) and converts it to a voltage capable of driving the film to varying levels of translucency
- Single ended power supply (48V on the light fixtures), so output had to be centered around 15V (total swing of 0V to 30V).
- 3 op amp solution
- Flex cable would sit in a board connector and wedge between the layers of the film. Connector had to be flat to squeeze between the optics (reflectors and lenses)

Moving Fader Lighting Console

- PCBs for mechanical testing and firmware testing of key-switch array and moving (motorized) faders

Nix (2015-2018)
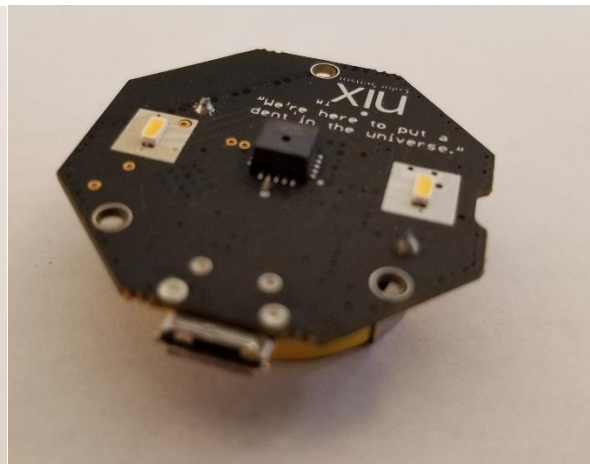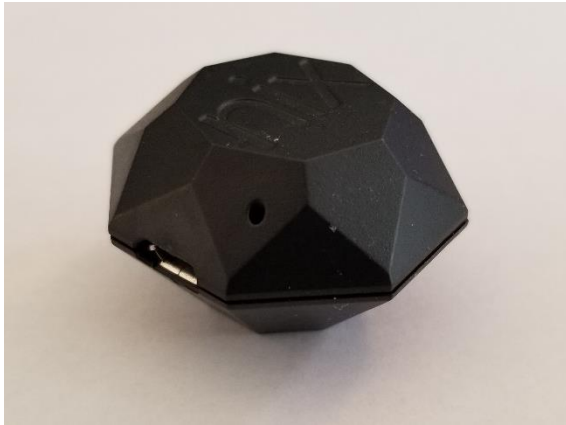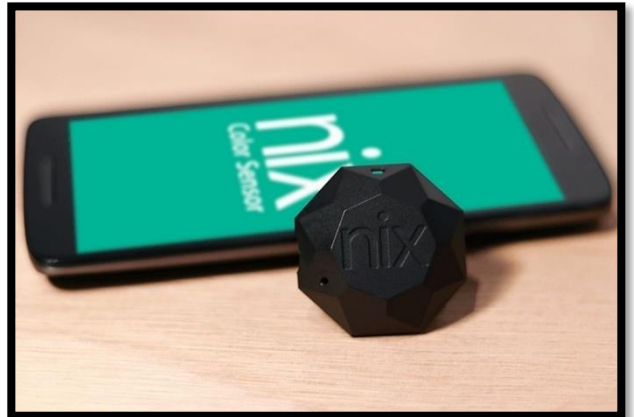
Nix Mini

- Miniaturization of the Nix Pro color sensor with smaller battery and better manufacturability
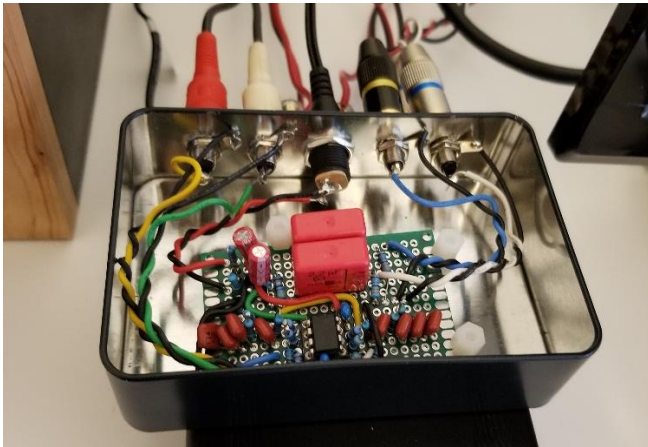- 4 layer PCB

Side Projects

Ribbon Microphone

- Hand cut and crimped aluminum foil ribbon (2.5um thick)
- Custom PCB as frame (foil is wedged between exposed pads
- Hand wound toroidal transformer

Phono Pre-Amp for Turntable with RIAA Equalization in Altoids Tin (2018)

Analog Synthesizer (2017)

- Sequencer, VCAs, VCOs, AR generator, LFO, VCF, Mixer, power supply (+12V,-12V)
- Circuits based on open-source circuits from MFOS
- PCBs designed and miniaturized by me to fit the eurorack format
- Panels made from laser cut acrylic and CNC milled MDF