Rocklock70 Coupler System

Overview
Rockland Mfg was in need of an electronic control system for their newly designed excavator coupler system. The coupler systems that are on the market today are powered with hydraulics and have safety features to prevent accidental detachment. The Rocklock70 coupler is powered with an electric actuator and has embedded safety switches to prevent accidental detachment. Our team’s largest challenge was learning electronic controls systems to design a safe, reliable control system.

Objectives
The objectives for the electronic control system project were as following:
- Installation time under 45 minutes
- Final marketable cost of under $500
- Compliance with strict safety criteria

Approach
- Identification of customer needs
- Thorough concept generation and selection processes
- Tedious patent searches and OSHA reviews
- Created a preliminary logical flow diagram of system operation
- Built a proof-of-concept prototype on a plastic lid to identify any limitations
- Built an Alpha prototype to test operation with the coupler actuator and sensors
- Built a Beta prototype to install on an excavator to test full system operation
- Performed operational tests to evaluate all system configurations

Outcomes
- Our system has reduced installation time by 6 hours which equates to approx. $750 per unit
- Final system cost per unit is $460
- The electronic control system is an industry first product
- OSHA’s coupler safety recommendations have been exceeded