Boeing LED Strobe Light System

Overview
The purpose of this project was to design a powerful LED strobe light system to replace the current Xenon strobe light system used by Boeing. The current Xenon bulb system is bulky, inefficient, and unreliable. Boeing challenged us to completely redesign the system to improve these problems. The challenges for this project include: careful component selection, analog circuit design, digital circuit design, and programming.

Objectives
Create an LED strobe light system to improve upon the following areas:
- Frequency Response
- Light Intensity
- Power Consumption
- Data Acquisition
- Light Measurement
- Size
- Longevity
- Reliability
- Oscilloscope Compatibility

Approach
- Designed LED test circuit on paper
- Constructed light measurement device
- Determined which LED is best for our project based on light intensity and frequency response
- Designed final prototype on paper
- Chose appropriate power supply (12V, 53A)
- Programmed microcontroller which controls the frequency and pulse width of LED light signal
- Tested final design
- Constructed custom printed circuit boards necessary for project
- Constructed final LED strobe assembly

Outcomes
We have completed every objective that Boeing required of us.
- As LEDs inherently last longer than most other light bulbs, this improves the longevity of the device
- Excellent frequency response of the LEDs allows for very short pulse widths and therefore great power consumption reduction
- Robust error correction coding provides for reliability
- Careful component selection of transistors and resistors also improves longevity and reliability
- Two BNC outputs allow for data acquisition and oscilloscope compatibility
- Includes light measurement device swing-out arm