**mDigital Camera**

**Electrical Engineering Report**

**Abstract**

Our digital camera prototype works by utilizing a grid of photo-diodes each of them connected to a trans-impedance amplifier which converts the current to a voltage. We use that voltage to power an array of LED's and as a input for or Psoc ADC readings. The multiplexer collects the voltage information through 4 channels. This information is then read by MATLAB to generate a gray-scale image to then displaying it on the screen as an array that represent the irradiance captured by the photo-diode.

**Project Description**

The alpha prototype aims to design and develop a primitive digital camera that uses photo-diodes as an image sensor. Trans-impedance amplifiers are used to increase the strength of \textbf{current} and convert it into a \textbf{voltage} reading that is now linearly dependent with irradiance. Photo-diodes are light-sensitive devices that can convert light into electrical signals, making them an ideal choice for capturing images in digital cameras. The project will demonstrate how photo-diodes can be combined with amplifiers, multiplexers, ADC and the Psoc environment.

**Sensors (if applicable)**

Photodiodes are connected in reverse, with the cathode connected to +5V and the anode connected to a resistor that is grounded. When light hits the diode, it triggers a current to flow through the resistor, generating a voltage across it. The sensitivity of the photodiode can be adjusted by selecting a resistor value, and this voltage can be transformed into a grayscale color.

**System Design**

The image sensor, a photodiode, is the most crucial component of a digital camera, responsible for capturing the light and converting it into an electrical signal. The multiplexer is used to select and route signals from different sensors to show an image, with a reduced number of wired connections. The image data captured by the image sensor needs to be sent to a computer by a cd card. The camera is powered through the Li-Po charge battery.

**Firmware**

**Software or Mobile App (if applicable)**

In the project, the ADC Psoc voltage readings are used to read values of intensity which are then converted to a color value. We also implemented the code for the usage of multiplexer CD74HC4067 with the PSoÇ environment. The CD74HC4067 is a 16-channel multiplexer that can be used to select and route signals from multiple sources to a single destination. This makes it useful for digital camera design, where it can be used to gather information from multiple photodiodes and route it to the processing unit for image creation.

**Other technical sections that may be relevant to your specific project.**

**Project Budget**

The bill for materials for this project is $163.15. We also have five team members, who work on this project 10 hours a week and are asking for $25 pay. Which is totalling to $1,250 for one week of work.

**Conclusion**

**References**

