Project Proposal
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Group Name - Camera Control

A short project proposal describing in broad terms what you plan to build and how you plan to build it:

We propose to find an older digital camera with a usb port and program the DE1 FPGA to control it. Functionality we will be looking to incorporate will be :
- Turn camera on and off
- Preview image on camera LCD or external display
- Show light meter readings
- Set aperture
- Set shutter speed
- Control focus
- Make exposure
- Read sensor data
- Write image file to camera sd card or to network server

This is not an exhaustive list. Functionality may be dependent on available api. I have put in a request to join the Canon Developer Community to gain access to their APIs and SDK. This will facilitate the job of communication between the DE1 and the camera. In order to make a good image from raw sensor data, we expect to make a stack of profiles for the sensor under different lighting and time conditions to compensate for different pixel gains across the sensor. This could be accomplished by taking photos of a neutral gray patch with uniform reflectance and note the variance in response of all the pixels.

The user interface would be programmed in C and run from a linux distribution on the arm portion of the DE1. The sensor profiles would be generated in this program and stored on the micro SD card. The raw sensor data would be processed and formatted by the FPGA and passed back to the camera for storage on the SD card.

If interfacing with a consumer camera would present too many communication challenges that would take us away from the core focus on embedded systems we could find a simpler camera system to interface with.