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Touch Screen Smart Mirror - Project Status Report

**Planned Work:**

* Order and Test Teensy 3.2 (MK20DX256VLH7) Microcontroller board for use in project
  + Load drivers and get example code working
    - Mouse/keyboard control
    - ADC values
  + Test ADC values at 30” Tx/Rx distance, mostly using modified example code
* Find a way to R&D Tx and RX arrays for DEMO day.
  + Design PCB to hold LEDs (best way to keep alignment)
  + Check costs of Perfboards vs. PCB

**Work Results:**

* Part came in from Adafruit in 2-day turnaround for $20
* Drivers loaded and Mouse control code worked after an hour of debugging
* ADC values are inconsistent. There are 2 ADCs in the MK20DX256VLH7 chip that are mapped to different I/O pins. Regardless of code configuration, ADC\_1 values had horrible resolution (basically 2 or 3 usable MSBs), ADC\_2 values had 13-bit resolution. I can’t explain why there is a difference, my hope is I have a damaged ADC.
* Beam break was easily detected at 30”. High-res ADC could also detect partial beam breaks. “Bad” ADC\_1 is still usable as a 1-bit (broken or unbroken beam) value if I wanted.
* ADC testing showed that even though the Teensy 3.2 advertised “5V tolerance”, the ADC only reads up to 3.3V. This was confirmed upon reading the MK20DX256VLH7 datasheet.
* I increased the value of the Rx collector resistor from 1k to 10k. This gave me much better sensitivity with respect to distance.
* Discovered 2-layer PCB from PCBExpress is similar in cost to same area Perfboard.
* Designed PCB to hold Rx and Tx LEDs for demo day in PCBExpress

**Future Activities:**

**Short Term:**

* Order another Teensy 3.2 and test ADCs
* Re-design circuit to work at 3.3V instead of 5V (Benefits of Teensy 3.2 board as an HID device outweighs source voltage selection)
  + Pick logic chips that work a 3.3V (LS138 & LS164)
  + Pick new resistor value for Tx LED
* Board review and Order PCB for Demo-Day board