Documentation on Motorizing the Kamerar Slider Dolley

# Functionality / Goals

The goal of this project is to motorize the kamerar slider and this motorization will have the following functionalities as its basic:

* Control of speed through a potentiometer
* Control of the direction of slide
* Auto-stop on its limits at either end of the slider
* Status LEDs:
  + Power on/off
  + Currently moving
* Use of an LP-E6 Canon Battery / 9 Volt batteries to power the system

The hope is that with all these functionalities, this will all be an integrated design that is simple and easy to use!!! And possibly expandable to other functionalities

# Design

## Movement

Use pulley and timing belt system. GT2 pulley and belts are designed for linear movement compared to MXL pulleys that are made for transferring rotations.

<http://www.ebay.com.au/itm/261322072328?ssPageName=STRK:MEWNX:IT&_trksid=p3984.m1497.l2649>

Use motor that is geared down instead of a stepper motor, because it has a holding torque that should be able to hold the camera stationary if anything happens (battery runs out, etc). Use pololu’s micrometal gearmotors 298:1 (might not be enough) so considering the 1000:1 or even the bigger sized 25D mm metal gearmotors. Will do after testing.

<http://www.pololu.com/product/2218>

## Power

Will try to use Canon’s LP-E6 Battery so only need to carry 1 battery for everything.

Battery terminals options:

<http://au.element14.com/te-connectivity-amp/1-962841-1/contact-tab-awg20-17/dp/1772748?in_merch=true&MER=MER-L53-L5IB-PD-ALT-CNN&>

<http://au.element14.com/jsp/search/productdetail.jsp?SKU=1761479&MER=MER-BN-PR-1761479>

## Electronics

### Microcontroller

Use an atmega32u4, as it has built-in USB programming, no need for an external FTDI chip. Requirements are:

* 1x Analog Input
* 5x Digital Input/Output
* 2x PWM (dependant on motor driver)

Breakout board for the ATMEGA32u4:

<https://github.com/adafruit/Atmega32u4-Breakout-Board>

<https://www.sparkfun.com/products/11117>

Tutorial on programming the Atmega32u4:

<http://forums.adafruit.com/viewtopic.php?f=24&t=23266>

### Motor Driver

### Motor Terminals

To make sure the terminals are easily removable and is contained in the design, the plan is to make a PCB that has allowances for the terminals.

The PCB will have a hole in the middle to let the centre of the motor out and will have two contacts on either side for the motor contacts. This way, the capacitors required for the motor can also be integrated into this PCB.