SliderPro 200

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The three components of the **SliderPro 200,** along with a digital camera and certain Kodak slide projectors, allow the unattended copying of every color slide in a slide tray or stack loader.

> **1.** The **SliderLamp** replaces the too bright (and also hot, fragile, and expensive) halogen projector lamp.
> **2.** Your digital camera rests horizontally on the **SliderPlate** at the level of the slide projector's lens.
> **3.** Your camera and projector can be operated automatically with the **SliderSwitcher**.

All changes made to the slide projector are temporary – the projector can be returned to normal function in a few minutes.
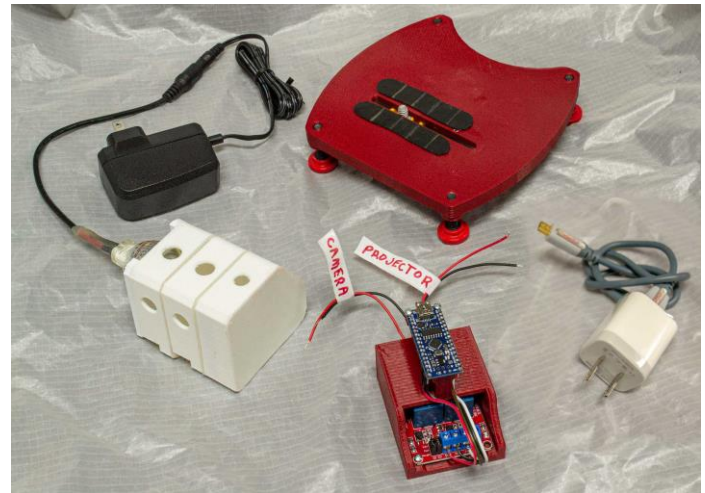
SliderLamp

With some Kodak projectors that allow the lamp housing to be removed, the **SliderLamp** can slide in to replace the housing and illuminate the slide. Set the original lamp housing aside in a safe place – it can be reinserted for normal use.

The **SliderLamp** includes a 2.5 watt LED lamp and three diffusers to provide a bright, even, background light. The **SliderLamp** comes with a 12 volt power supply so it is independent of the projector's power.

The LED lamp snaps into place at the rear of the **SliderLamp**. After handling the **SliderLamp**, check to make sure the lamp is well seated.

The **SliderLamp** housing should be slid (angled and wiggled) into the projector lamp cavity and positioned to produce even illumination for the slide. The front of the **SliderLamp** should be at least 3/4" from the slide (to keep the front diffuser out of focus range). Some projectors will not allow the **SliderLamp** to get any closer than that. Some trial and error may be required to find the best position for the **SliderLamp**, but any position will produce results that look good to the unaided eye. Aim the **SliderLamp** a bit to the left (from the rear of the projector) and results should be

good. If you can measure the brightness across a photo taken of a blank slide, more precise adjustment can be made. The free FIJI (https://imagej.net/software/fiji/) can make such measurements. When you are satisfied with the results, lock in the position of the **SliderLamp** with some pieces of cardboard or tape (not included).

It is best to have the **SliderLamp** powered on only when the projector fan is running. The bulb does not get very hot, but it is contact with PLA plastic which gets soft when warm (130°F).

The color of the **SliderLamp** is similar to the warm color of a tungsten bulb. It is best to use the custom white balance feature of your camera to compensate for this so your slide copies retain their original color balance. A blank slide is included for this. Fill the frame with the light from the **SliderLamp** (exclude the slide mount) when setting the white balance. A test photo of a blank slide should then be steely gray.

The **SliderLamp** was designed for the Carousel 4600 projector and should fit in all 4000 and 5000 series models (but has not been tested in them). It should also fit in Ektagraphic III projectors (but not the Ektagraphic).

SliderPlate

Remove the projector lens and set it aside in a safe place. Use the projector's front tilt control and rear leveling foot to make the projector as horizontal and as possible. Attach your camera (with a long focal length macro lens, e.g., 80mm to 120mm for APS-C sensors) to the **SliderPlate** with the included tripod screw. If your lens does not touch the **SliderPlate**, you can insert something to prop it up (without interfering with the focus ring) to make it more solid. Position the camera and plate so the lens points into the projector's empty lens opening and the camera's optical axis is aligned with the projector's optical axis. The height of the camera can be adjusted with the red thumb screws on the four leveling feet.

Turn on the projector and have a slide drop into position for projection. Plug in the **SliderLamp** and look through the viewfinder of your camera. Move the **SliderPlate** and camera until the slide satisfactorily fills the frame and is in focus. View the camera from above and from the side and adjust the position and tilt of the camera until the lens seems to be on the axis of the projector's empty lens tube. Then make final adjustments while looking through the camera viewfinder and focusing on the slide.

The non-slip feet on the projector and the **SliderPlate** prevent them from most unintended movements. Mark the position of the projector and **SliderPlate** with tape so they can be returned close to the correct position in case either has to be moved (e.g., to change the camera battery).

To fill the frame with certain slide formats (e.g., 126 film or Super 127 film) the **SliderPlate** can be slid back. Slides should be sorted by format when organized in Carousel trays so the **SliderPlate** can stay in the same position while copying batches of slides.

SliderSwitcher

Digital copies of color slides can be made without the **SliderSwitcher** by manually advancing the projector and releasing the camera shutter. To automate the process so entire trays of slides can be processed unattended, you can use the remote control capabilities of the camera and projector. You will need cables that plug into the projector remote port and the camera remote port or remote controls for each.

The **SliderSwitcher** will complete the circuit that causes the projector to advance one slide or the camera to take a photo. Wires from the two relays in the **SliderSwitcher** must be connected to the remotes or remote cables for the camera and projector. Relay #1 (the first to blink) will operate the camera and the other operates the projector.
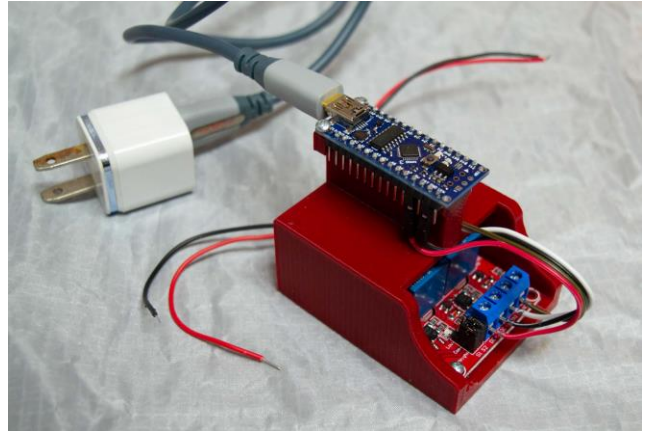
To test the **SliderSwitcher** itself, plug the Arduino Nano into power using the included phone charger and USB cable or power it from a computer USB port. When the Arduino is powered, red LEDs on both the Arduino and the relay module (inside the red housing) should be lit. Red LEDs on the relay module should blink in turn and simultaneously a blue LED on the Arduino should blink. If LEDS are not blinking, check the wired connections. With each blink, one relay is completing a circuit for 1/10 of a second. Your job is to connect the first relay to the camera and the second relay to the projector so the circuit completions trigger the desired action.

The terminal block for connections to the camera and projector is hidden in the enclosure (to protect you from shocks from the projector). To access the blocks the relay module and Nano must be unscrewed and removed. Make sure the connected projector is turned off when accessing the block.

The sketch loaded on the Arduino Nano is here: https://create.arduino.cc/editor/cfastie/7574b135-027f-4461-a4bd-74cdd42cdcbf/preview. You will need an account, but at that site you should be able to edit the sketch and download the new version directly onto your **SliderSwitcher**.

A USB data cable (for PCs: USB A male to USB mini B) is required for loading a new sketch (not included, the USB cable with the **SliderSwitcher** is for power only). The online Arduino editor will detect when the Arduino is connected via USB to your computer. At the Arduino editor you must select "Arduino Nano" and then "ATmega168" (the included Nano is the unusual ATmega168 version with half the memory of the standard 328p chip).