



## High Speed Photography Kit

Take “impossible” pictures with your digital camera, and everyone will wonder “How did you do that?”

Capture high speed events – A splash, popping balloons, breaking glass, or ?

Adjustable flash controller triggered by light or sound



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The Flashkit contains what you see here, a one-time-use camera, flash controller, red wire, green wire, phone jack, cable, microphone, and balloon.

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## What you need

To convert the one-time use camera into a high-speed strobe, you need a soldering iron, solder, a drill, 5/32" drill bit, pliers, and a small screwdriver. Use your own digital camera to take the pictures.



If you don't have soldering tools, get them from Radio Shack.


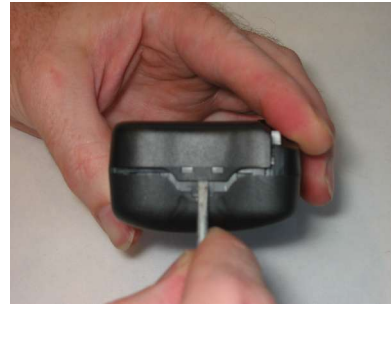




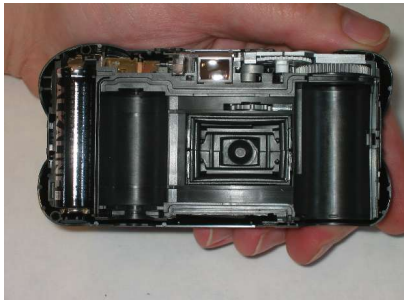
Soldering Iron, Radio Shack 64-2070



Solder, Radio Shack 64-005

### Assemble the Kit

	<p>First, remove the stickers and goo from the outside of the camera.</p>
	<p>There are four side latches (left, right, top, and bottom). We found it easiest to start with the left. Using a small, flat-bladed screwdriver, gently pry open the latch, and slightly separate the plastic back from the camera, which keeps the latch open.</p>
	<p>While holding the front and back slightly apart, pry out the top and bottom latch. Finally, pry out the right latch and remove the plastic back. Try not to break the latches. (If you do, use duct tape or rubber bands when reassembling.)</p>
	<p>Remove the plastic back of the camera and set aside for later.</p>



Remove the film and battery. The battery is shown on the left in this picture.

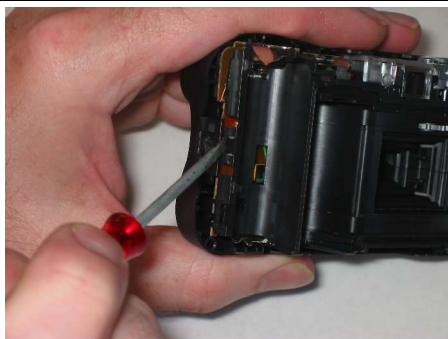


The flash capacitor might be charged up, even if the camera has never been used. The charged-up capacitor leads should be visible near the center at the bottom, when looking in through the back of the camera. Using the tip of a small, insulated, plastic-handled screwdriver, short the two capacitor leads together. You will probably see a flash and hear a loud pop.

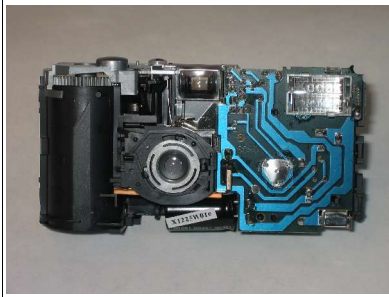
**Caution: If you ignore this step, you may get a nasty electric shock!**



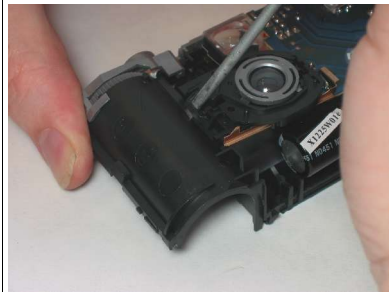
Here is a good photo of the spark that comes from discharging the capacitor. (But this photo is out of sequence, we haven't disassembled the camera this far yet.)



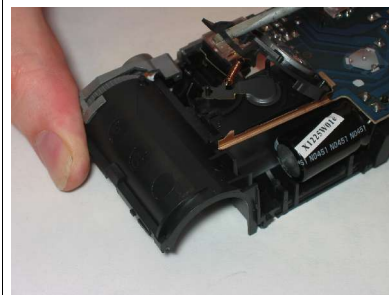
After you are **sure** that the capacitor has been discharged, gently pry off the latch that holds the plastic front.



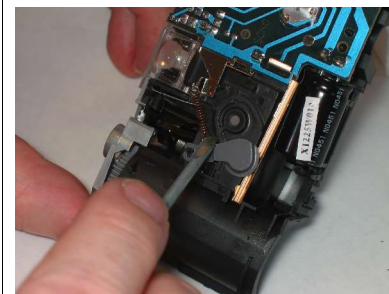
Behind the plastic front is a lens and shutter.



Carefully pry off the lens holder as shown.



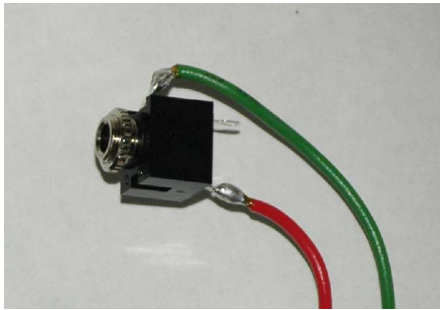
Beneath is the shutter, with a spring connected to it.



Remove these as well. Now there should be a hole in the center that is open from the front to the back. The shutter spring is attached on its fixed end to a shiny piece of sheet metal that will have the red wire soldered to it. Note its location.



We mount our trigger connector on the plastic back, with the connector body taking the place of the film canister. Drill a 5/32" hole in the plastic back, as shown.



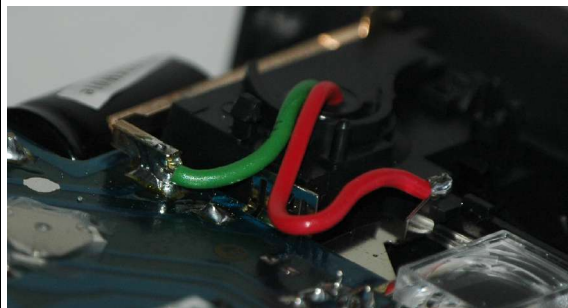
Solder the wires to the 2.5mm connector. Pay careful attention to the location of each wire in the Photograph. Incorrect wiring can damage the flash controller.

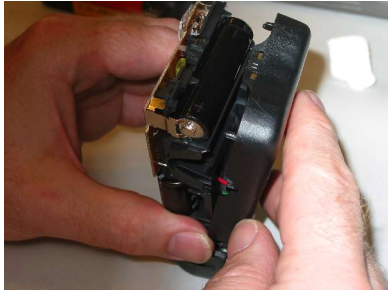


Install the 2.5mm connector into the hole in the plastic back.



Thread both wires through the center hole and solder them as shown, red wire on the top, and green on the bottom. Do not reinstall the shutter and lens. Note the detail photos below: both wires are soldered to metal parts in the camera. The red wire is soldered to the little hook that held the shutter spring.





Snap the plastic front onto the camera **before** reinstalling the battery. Installing the battery will re-charge the Capacitor, so be careful! Note the polarity of the battery. If you put it in backwards, it permanently damages the circuit, and you will have to start over with new camera.



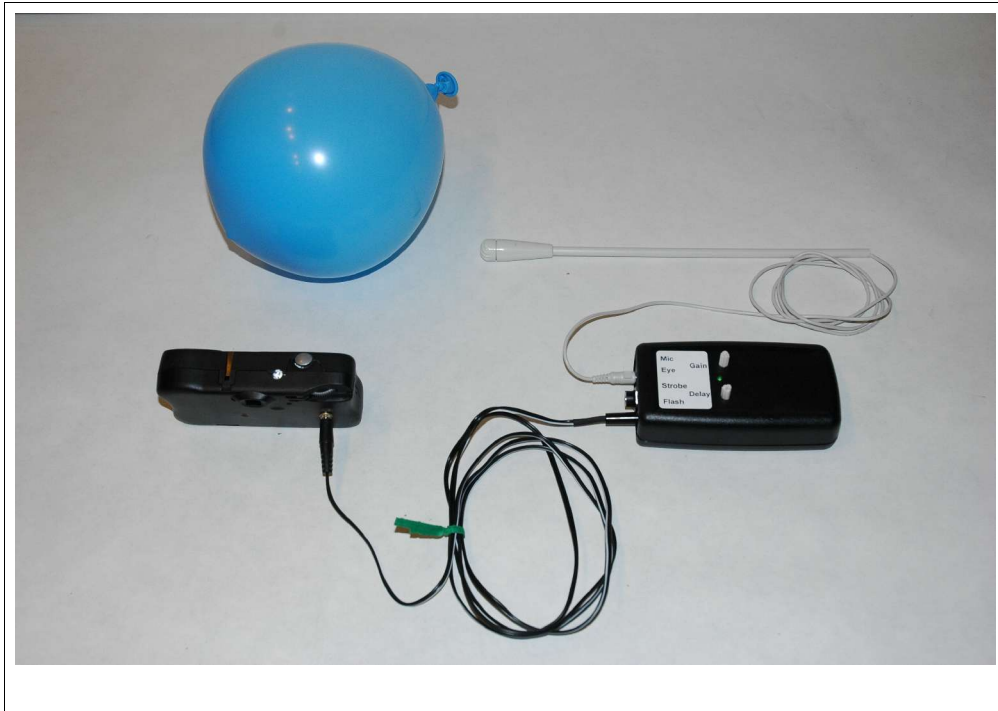
This detail shows that the “+” end of the battery goes into the “Y” shaped battery connector inside the camera.



With the battery installed inside, snap the plastic front back onto the camera. Then snap the plastic back onto the camera, and the flash is complete. Congratulations, you are ready to take high speed photographs!

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### Using the Highspeed Flashkit



Hook up the cable from the flash controller to the modified disposable camera, and connect the microphone to the flash controller. Press the button on the front of the disposable camera until the 'charged' indicator light on the flash is lit. This indicates that the flash is ready to go. Make a noise to test the flash. Adjust the sensitivity of the microphone by rotating the adjustment marked 'gain'.

If the room is too noisy, the flash may fire right away. If this happens, decrease the gain.

It is necessary to press the button on the front of the disposable camera between flashes. A small light on the back of the camera lights up when the flash is ready to go.

Connecting the cable between the flash controller and the disposable camera turns on the flash controller. The green light on the front of the flash controller should light up.

**Remove the cable from the flash controller when it is not in use to prevent draining the battery.**

When the microphone is disconnected, the flash controller is triggered by light. The same gain adjustment controls the sensitivity of the light sensor. It is easy to trigger the light input by shining a flashlight on the 'eye' of the flash controller.

## Ready...

Blow up a balloon and place it and a subject in a good spot for picture taking.

1. Set camera for a long exposure time, say two seconds, using “Shutter priority.” Also, turn off the camera's built-in flash. You may also want to experiment with manual focus versus autofocus. Use camera's “Macro” mode for exposure control, if available.
2. Position the camera so it is focused and pointed at the balloon (a tripod is handy for this, if you have one)
3. Position the flash so it is pointed at the balloon and not at the camera (a tripod is handy here, too, if you have another one).
4. Plug the microphone into the Flash Controller.
5. Position the microphone close to the balloon.
6. Plug the cable into the Flash Controller and the flash (or strobe). There are two possible outputs from the Flash Controller. Either or both can be used. One cable (a normal guitar cable, not supplied) connects the Flash Controller to the SnapShot II strobe (not supplied). The other cable (2.5mm male mono to 2.5mm male mono, supplied) connects the Flash Controller (supplied) to the modified disposable camera flash (unmodified camera supplied).
7. Power on the Flash Controller and the flash (or strobe). Connect the output cable to power up the Controller. Press the button on the front of the camera for a few seconds to power up the flash.

## Set...

1. Turn out the lights. The room doesn't have to be completely dark, but darker is better.
2. Press the shutter release. If you don't use a manual focus, your camera might need a little light to adjust the focus in the dark, so wait about 1 second for the lens to focus.

## Go!

Pop the balloon with a hatpin. The sound triggers the camera flash. Wait for the shutter to close or you will ruin the shot. Some cameras make a little click when the shutter closes. Then turn the lights back on and admire the photo.

## Do It Again!

If you're like us, you'll want to make a few adjustments and shoot again.

Adjust the Flash Controller delay if necessary: more delay means a bigger hole in the balloon. There are two knobs on the Flash Controller. One is for delay, and one is for

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gain. By twisting the delay knob, more or less delay can be added. The same is true for gain. Increase the Flash Controller gain if the flash didn't go off.

The distance from the microphone to the balloon also causes delay, because sound takes some time to get from the balloon to the microphone. If there is too much delay with the flash trigger set to minimum delay, move the microphone closer to the balloon.

Move the flash closer to the balloon for more light if the photo is too dark. If you're proud of one of your photos, please consider posting it where we can all enjoy it. Many of us are posting our highspeed pictures on flickr.com.

## **Getting More Light**

If you need more light or if you don't want to build the kit, you can buy plenty of flash power. For highspeed pictures, normal electronic flashes are too slow. Instead, use the SnapShotII strobe light. We get these from musiciansfriend.com: there are links to the cable and strobe on the quaketronics.com web page. The SnapShotII is slightly faster than the disposable camera flash. More than one SnapShotII can be used at the same time by daisy chaining them together. Using multiple SnapShotII strobes helps eliminate shadows. We take our pictures for Make magazine using two SnapShotII strobes. They are triggered by our flash controller with the light from our digital camera's built-in flash.

The SnapShotII also comes with a mounting bracket. The bracket can be mounted to a tripod with a 1/4-20 wing nut.

Support for the High Speed Photography Kit is available via email. Please contact [support@quaketronics.com](mailto:support@quaketronics.com)

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SnapShotII, Musician's Friend  
810123



1/4" Phone cable  
Musician's Friend  
332100

**Using the Flash Controller with an External Strobe Light**



## Use the Light Sensor to Trigger Highspeed Photos

The flash trigger has a built-in photosensor, which we call the “Eye”. It is located next to the connector for the microphone. If you want to trigger a flash using light instead of sound, simply unplug the microphone, and the flash trigger will trigger on changes in light intensity.

For example, you could aim a laser pointer at the Eye. Turn the gain up (because the Eye is less sensitive to red light). It helps to mount the laser pointer on something sturdy so that the beam is always pointing precisely at the Eye.

Anytime the beam is broken, the flash controller will trigger. This feature is good for taking highspeed photographs of things in motion that can be arranged to break the beam. The delay knob on the flash controller works the same as it does with the microphone: you can dial in a pre-determined amount of delay so that the flash occurs an adjustable time after the beam is broken. Using the Eye to capture highspeed motion is very similar to using the microphone: both require a darkened room, a digital camera set on a long exposure, and the camera's flash turned off.

## Use the Flash Trigger for Fill Flash

“Fill flash” is used to eliminate shadows in photographs. Your camera's flash can produce harsh lighting in certain situations, which can sometimes be eliminated with additional, synchronized fill flashes. Position the fill flashes so that they are pointed at your subject from the sides (or top and bottom, or both).

The flash trigger can synchronize additional flashes (either the one made from the disposable camera or a SnapShotII, or both) to your camera's flash. Simply remove the microphone and your flash trigger is now sensitive to light. Turn the delay down to a low level, and experiment with the gain so that the flash triggers only when your camera flashes. It is not necessary to turn off the room lights when using fill flash.

Flourescent lighting can be tricky, because it flashes on and off 60 times per second, and therefore can cause “false” triggers. Either turn off the flourescents, or position the phototransistor “Eye” so it is not aimed at the flourescent lights. A flashlight is handy to experiment with the Eye.