

Creative Flash Photography

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I. A Flashy Primer

At one time or another, we have each used a flash in photography. The primary way that a flash is used is to light a subject when the ambient light is too low to take an image. Learning how to use flash properly could take an entire workshop. That is not my purpose here. In this workshop, I want to teach you three things: how your flash works, how you can paint with a flash, and how to stop motion with a flash.

On-camera Flash Modes

Most modern flashes have three modes of use for a flash that is attached to a camera body: M, A, and TTL. "M" or "manual" was the first mode developed for flash. In this mode, the flash puts out a constant amount of light. The flash charges up, and when triggered, the flash shoots a burst of light. Modern flashes allow the user to control the amount of light, usually in increments of 1/2, 1/4, 1/8, etc the amount of the full flash exposure. The disadvantage to this flash mode is the complicated way that the light quantity was measured. To use "M" mode, you either had to have a flash meter to measure the light, or you needed to use guide numbers to determine distance and aperture settings.

The second flash mode to be developed was the "A" or "automatic" mode. Popularized by the Vivitar 283, this flash mode frees the user from needing either a flash meter or the use of guide numbers. The Vivitar 283 (and modern flashes) does this by means of its "auto thyristor." When the flash is fired, some of the emitted light bounces off of the object and back to the flash. The flash has a sensor to measure this light quantity, and when enough has bounced back, the flash will cut itself off. A close object will cut the light off faster than a more distant one.

The third flash mode used on cameras is the "TTL" or "through the lens" mode. In this mode the camera measures the amount of light that is reflected back from the object. Usually, the camera measures the amount of light that is reflected off the film plane itself. This was a huge advance in flash photography. Instead of the user setting the aperture and the flash to the correct exposure range, the camera does the work for itself.

Take It Off - Still Connected by an Umbilical Cord

The main limitation of the use of on-camera flash is that the lighting direction is determined by the location of the camera. This can result in nasty results such as unattractive shadows, red-eye, and a host of other problems. So, how do you overcome these obstacles? The solution to these is to take the flash off of the camera. But do you lose the ability to use TTL flash when you do so? No. Each of the major camera manufacturers has a special cord that allows you to take your flash off of your camera while allowing you to use all the bells and whistles of modern TTL flash. Mind you, these cords are not inexpensive.

Completely Free

Ultimate flash freedom comes when the photographer completely severs the umbilical cord connecting their flash from the mother camera. This can be done in one of two ways. In the first,

the camera has either another flash or a radio transmitter attached to it. The off-camera flash as a receptive “trigger” attached to it. When the image is made, the light or radio signal is given off by the camera and sensed by the trigger that causes the flash to fire. Some of these triggers are sophisticated enough that they can maintain a TTL exposure.

The second way to use a flash completely independently of a camera is to trigger it manually. Usually, this is done under low- or no-light conditions. But, more about this later...

Complications - Object Size Matters

If you are using a flash on A or TTL mode, then there are several situations about which you need to be careful. One is the size of the object that you are photographing. Suppose that you are taking a flash image of an object that takes up a small part of your viewfinder, and the rest of the objects in the viewfinder are at a much greater distance from your camera. For example, you may be taking a nighttime image of a person who is 20' from you, and the rest of the image is a background that is in the far distance. Remember that in the A or TTL mode, the flash or camera shuts the flash off by measuring the amount of light that is reflected back to it. But, if the subject takes up a small part of the viewfinder, then little light will bounce off it and back to the flash or camera. The flash simply will not be cut off. The flash will try to light up the objects in the distance, and will fire at full power. This will result in the flash “blowing out” your subject. So, keep this in mind when you take a flash exposure.

Note that this situation has been solved in the most modern cameras. Nikon, for example, has created “D” lenses. These lenses measure the distance setting on the lens, and feed this information back to the camera body. The camera says, “Oh! You only want me to light up that person who is 20' from you, not the woods in the distance.” It then controls the flash's exposure so that the subject is not blown out.

Complications - It Reflects on You

Regardless of the size of the object that you are photographing, you also need to keep the reflectivity of the object in mind when you take any photograph, flash or not. Light objects will reflect more (flash) light to the flash or camera. This will result in the flash being cut off sooner than it should. The subject will be under-lit. Similarly, dark objects reflect less light. This will result in the flash being cut off later than it should be. The subject will be over-lit. This is one situation where we use exposure compensation.

Complications - Light Quality/Temperature

Photographers have long written about the importance of avoiding the light of mid-day. For one thing, the light can be too hot. Noonday light has a color temperature of 5000 to 5500k. Flashes are set to emit this same type of light. And it's often not very attractive. As photographers, we want to use the warm “magical light” occurs just after sunrise and before sunset. Can we get this same light out of our flashes? Yes. We do this by adding a colored sheet of plastic - a gel - over the front of our flash. And while the most popular use of gels may be to warm up flash light, the truth is that we can color our flash's light any color we wish. One gel manufacturer is Rosco. See them at <http://www.rosco.com/us/index.asp>. B&H photo (<http://www.bhphotovideo.com/>), will send you a free sample pack of their filters. Conveniently enough, these sample swatches will fit your flash perfectly.

Complications — Exposure Length and Flash Power

When a flash is triggered, it does not instantly attain full lighting. In fact, it takes the flash a bit of time to get up to full power. Similarly, it takes the flash a bit of time to turn the light off. If we were to make a graph of this, we would see that the amount of light that is given off looks like a hill on the curve. So what happens when we use a flash at less than full power? The answer is that the flash (or camera body) cuts the flash off before it has fully discharged. (For the technically minded, see examples of the data and graphs at

<http://www.chem.helsinki.fi/~toomas/photo/flash-discharge/regular.html>. What this means is that the duration of time that a flash is on is related to the amount of light that it puts out. Said another way, when you dial your flash down from its maximum power, you shorten the duration of time that the flash is on. For example, with a Vivitar 283, the maximum flash duration is 0.003 sec. At its minimum power, the flash duration is reduced to about 0.000030 sec (http://hiviz.com/activities/guidebook/Activity_02.html.)

II. Painting with Light

When you paint an object with light, you use a light source other than the sun. This source is usually your flash, but you can light paint with a candle, a flashlight, a campfire, or any other light source that you can imagine. You can use this light source alone, or you can color the light source by using a gel as discussed above. Use any film that you wish. The ISO will only affect the amount of light that your flash will have to put out.

Before you start to paint with light, know that this is not an “exact” science. You will need to take time to experiment for yourself. Like anything else, it takes time and practice to develop your own technique.

I’m in the Dark

One way to do light painting is to take photographs in a completely darkened room. Prepare for the shot by deciding the subject that you want to photograph and set up the scene that you want to shoot. In many situations, you will want to light the entire scene. However, what if you want to light a scene against a dark or black background? In this case, you will want to be sure that you do not light the background with your flash. One way to do this is to keep your subject far away from the background. Portrait photographers use this technique. If they want to light the background, they then use a separate light source for it. If you want to take a picture with a black background, then you may want to purchase some black fabric from a fabric store.

Choose your photographic equipment as you normally would. Focus on the scene and select your depth of field. It is important that your camera does not move during the exposure. Set it on a solid, sturdy tripod. Set your camera to the “B” or “bulb” setting. You will need a cable release to keep the shutter open. Put your lens cap back on your lens. It is going to act as the shutter during the exposure.

Prepare your flash for the shot by setting it either on the “M” or the “A” setting. If you use the “M” setting, then you will need to use a flash meter to control your exposure. You can modify the amount of light by turning the flash’s power down, or by varying your distance to the object. If you need a lot of light, you will probably want to experiment with your flash at full power, while you vary the distance from the flash to the subject. You can also use your flash on the “A” setting. Decide the color that you want to paint the scene. Set out the gels that you are going to

use so that you can find them easily. It's pretty easy to get confused in the dark!

Take the exposure. Keep the lens cap is on your lens. Turn the room lights off. Open the camera's shutter. Remove the lens cap from your camera. The next step may surprise you. You can actually walk into the scene as long as you do not light yourself with the light source. (You may want to wear dark, non-reflective clothes.) Now paint the scene with your flash! If you need to change a gel, then put the lens cap on your lens. Turn the light on, change the gel, turn the light off again, and continue to pain the scene. When you have finished, then replace the lens cap and close your camera's shutter. That's all there is to it!

Early on in doing light painting, I found out that the red light on the back of my flash will show up in the image if I walk in front of the lens. There are several ways to solve this problem. One way is to put some black tape over the light. A related problem is that, if you have your flash tilted toward the lens AI ALL, then the light of the flash will show up in the image. I solved both of these problems by buying a sheet of black 8" x 10,' craft foam at a sewing store. I use this to shade the flash from the camera.

By the Light of the Silvery Moon

The second way to do light painting is to mix ambient light with light from your flash on other supplementary light source. One common way that people do this is to take photographs by the light of a full moon. Troy Paiva has a great site (<http://lostamerica.com/>) that is filled with images and instructions about this type of photography. The "bottom line" is that you shoot within four days of a full moon, use ISO160 tungsten film for 5-8 minutes at f/5.6. Why tungsten film? You can use any film to shoot at night. However, they often come out looking like its daytime! If you use tungsten film (or a blue filter), then the images look more like they have been made at night.

Want to spice up you night time full moon photography? Then add gelled-flash to your images. Let your imagination run wild. Again, you will need to bracket your exposures and do some experimenting for yourself.

Do a Google search on "night photography," and you'll find a lot of sites. Be sure to check out The Nocturnes: <http://www.thenocturnes.com/>. Look at their gallery to see some great images by a variety of photographers.

III. Stopping the Action

I don't know about you, but I have always been fascinated by the work of Harold Edgerton. I was amazed to see his "stop action" images of water splashing in a pan of water, a bullet cutting a playing card in half, or a bullet exiting the muzzle of a gun. Later on, in the mid 1970's, I was introduced to the work of Stephen Dalton). I was amazed at his stop-action images of insects in flight. I decided that I wanted to do this type of photography. But the first step for me was to start simply and cheaply.

The best site to learn high speed photography is HiViz (<http://hiviz.com.>) To take high speed images, you will need your regular camera equipment, a flash, and some mechanism to trigger the flash. I would suggest that you start simply with popping balloons.

The best way to start taking this type of image is in the dark, as I discussed in the section on flash painting above. Set up your equipment as discussed above. Set your flash, or flashes, on

a tripod. One difference between high-speed photography and light painting, is that you will want your flash to be set on low power. Remember that I talked about flash output and flash duration? If your flash is set to low power, then the flash will emit light for only a short time period. To stop action, you will want to have your flash on low power. But what if I don't have enough light? Well, you may want to have more than one flash. Used Vivitar 283 (or 285) flashes are cheap. I have a bunch of them. Additionally, the 283 has a "VariPower Module" (VP-i) that allows you to control the output of the flash. When set to its lowest power, the flash puts out only 1/32 of full power and the flash duration is only 1/20,000 or 0.00005 sec. If you don't want to buy this additional module, then there is a cheap substitute for it. You can simply use either a paperclip or a 100 ohm variable resistor. (IMPORTANT NOTE! BE CAREFUL! Old flashes can have high trigger voltages that can seriously damage modern cameras. You can avoid damage by keeping the flash unattached to the camera.) Here is a section from a page at HiVis (http://hiviz.com/activities/guidebook/Activity_02.html.)

CAUTION! Be careful about adding older flashes to new digital cameras! Some flashes like the older Vivitar 283 models have voltages that will fry the circuitry in your digital camera. You can check the voltage by putting the leads of a multimeter across the contacts on the foot of the flash. To protect your camera, use a Wein Safe-Sync.

5 The Vivitar 283 has a feature that makes it possible to conveniently adjust flash duration. Note that the auto-thyristor module can be removed. Pull it straight out, away from the flash unit. This will expose an arrangement of five holes, as shown below. The two holes on the right (as seen with the flash unit upright and facing you) are the connections for the light detector. By inserting the leads of a variable resistor into these two holes, you can control the flash duration (and brightness) directly. Try this now with the 100-k Ω variable resistor.

Auto-thyristor module pulled out, revealing socket of 5 holes
Variable resistor has replaced auto-thyristor module

Tip: Often in high-speed photography, one wants the flash duration. In that case, one need not use the above. Simply short across the two holes in the sensor socket with a stiff wire. A paper clip works fine, as shown in the diagram to the right.

Sensing the Action: Do You Hear What I Hear?

You can use a tape recorder as a sound trigger. Again, HiViz (<http://hiviz.com/tools/triggers/triggers2.htm>) tells us how to do this:

"Sound triggers

A sound trigger discharges a flash unit in response to a sound or vibration created by either the high-speed event itself or some other action that initiates the high-speed event. The three parts of a sound trigger are the microphone, the amplifier, and a silicon-controlled rectifier (SCR). The diagram above shows how the components are connected. The microphone picks

up the sound of the event. The signal from the microphone is then amplified in order to gate the SCR, which acts as a switch. The amplifier output is connected to the gate and cathode of the 5CR, and the flash terminals are connected to the anode and cathode. When a sound is picked up by the microphone, the amplified electrical current flows in the gate-cathode circuit of the SCR. That in turn allows current to flow in the anode-cathode circuit, thus discharging the flash unit.

The SCR has a second function. It serves to isolate the amplifier from the voltage across the terminals of the flash unit. This can be as high as 330 V for older flash units. Newer units, however, may have low-voltage trigger circuits. In any case, an SCR rated for 400 V is sufficient.

When using a sound trigger, several factors influence the time delay between the high-speed event and the discharge of the flash. These include the intensity of the sound, the sensitivity of the trigger, and the position of the trigger in relation to the event. Changing the latter is a good way to fine tune the time delay, since one can use the fact that sound travels about 345 m/s in air at room temperature. (A convenient way to remember this is as a third of a meter per millisecond.)

The initial placement of the sound trigger is a matter of guesswork. If it is placed close to the subject and the flash discharges sooner than desired, the trigger can simply be moved farther away. Photographs need not be taken as these adjustments are made, because naked-eye observations are possible.

The fact that the delay between the production of the sound and the discharge of the flash depends directly on the distance between the source of the sound and the microphone can be exploited to photograph the event at different times. For example, with the sound trigger next to a balloon, one can catch a rip in the balloon just as it is beginning. As the trigger is moved farther away, the rip will also have moved farther. With two flash units, independently triggered at different times during the event, double-exposure photographs can be made to show the progression of the event.”

Now, it's time to connect the flash to the trigger. Thanks again go to HiVis (<http://hiviz.com/tools/triggers/makeown.htm>.)

“Connecting the trigger to the flash unit

The PC cord of the flash unit can be connected to the sound trigger without having to sever the cord to expose the bare wires. Here's one way:

- a) Cut a half-inch long section from the top of a plastic ballpoint pen cartridge. Insert this inside the collar of the PC cord as shown in the cutaway diagram to the right. If the plastic doesn't fit, shave or file off a little. The fit has to be snug to prevent the plastic from falling out. It serves as the insulation between the inner, positive pin and the outer, negative collar.
- b) Insert the positive lead from the sound trigger into the plastic sleeve surrounding the pin of the PC cord. Be sure that good electrical contact is made. Then wrap the negative lead from the sound trigger around the collar of the PC cord. Tape the leads securely.

If you don't mind cutting the PC cable, here are some other connection methods.”

Sensing the Action: Do You See What I See?

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Nah. We have already done a lot. See HiVis and the links below for more info on triggering your flash with sight or touch rather than by sound.

Helpful Links

General Night Photography

Apogee Photo Magazine: http://www.apogeephoto.com/dec2000/night_trick.shtml

Apogee Photo Magazine: Star Trail and Moonlight Photography

http://www.apogeephoto.com/mag7-6/stars_moon.shtml

Dark Sky Dreams: http://www.darkskydreams.com/html/night/night_frame.htm

Photo Know How -Tech Tips Series - Night Photography:

http://www.photoquest.com/photo_know/techtips/techtips3.shtml

Light Painting

Painting with Light: <http://photo-seminars.com/Seminars/PaintLight/Paintlight.htm>

Rosco gels: <http://www.rosco.com/us/index.asp>

Roscolux Filter Information: <http://www.rosco.com/us/filters/roscolux.asp>

Roscolux SwatchBook Sampler Order Page: <http://www.rosco.com/us/filters/swatchBookRequest.asp?type=roscolux>

Light Painting at Night

Michael Frye: <http://www.michaelfrye.com/index2.html>

Midnight Exposure: <http://midnightexposure.com>

Night Photographer Dot Com: <http://www.nightphotographer.com>

The Nocturnes: <http://www.thenocturnes.com>

Troy Paiva: <http://lostamerica.com>

High Speed Photography

Flash Slave Trigger: <http://www.aaroncake.net/circuits/slave.htm>

Harold Edgerton Center Home at MIT: <http://web.mit.edu/edgerton/main.html>

High Speed Photography Pages: <http://www.xtrsystems.com/strobe/index>

High Speed Shutter vs. Ordinary Flash Sync: <http://webs.lanset.com/rcochran/flash/hss.html>

HiViz: <http://hiviz.com>

A Home-Made Night-Operated Camera Trigger:

http://xray.bmc.uu.se/markh/cam_trig/cam_trig.html

Kapture Group: High Speed Stop Action Photography:

http://www.kapturegroup.com/main_htmls/photo.html

Simple Sound Synchronizers for Amateur High Speed Photography:

<http://www.rit.edu/~andpph/text-cheap-sync.html>

High Speed Nature Photography

High Speed Photography: <http://members.aol.com/mjbrown/HTML/highspeed.html>

Hummingbird Photography: An Online Guide: <http://www.rpphoto.com/howto/hummer/humguide1.asp>

Joe and Mary Ann McDonald's Wildlife Photography — How Do You Shoot Action?

Creative Flash Photography by John Schutt, <http://schutt.net/john/>

<http://www.hoothollow.com/DefaultAnswerJuneJuly.htm>

Joseph Van Os Photo Safaris — Camera Traps: <http://www.photosafaris.com/Articles/CameraTraps.asp>

Joseph Van Os Photo Safaris — Photographing Hummingbirds:

<http://www.photosafaris.com/Articles/PhotographingHummingbirds.asp>

Photographing Barn Swallows in Free Flight: <http://www.rit.edu/~andpph/text-flying-bird.html>

Stephen Dalton (The master)

Electronic Parts Suppliers

Digikey: www.digikey.com

Mouser Electronics: <http://www.mouser.com/index.cfm?handler=home>