An Introduction to Photographic Lighting by John Siskin

Lesson #1: Strobe Lights - Basics

Welcome to Lesson 1.

Photographers and photo critics sometimes speak of artificial light as though there is, inevitably, some trace of origin in the photograph. This is not true!


Mole Richardson Light

There always remains some sense of the craft of the photographer engineering the lighting in the photograph. If the photographer is a sensitive craftsman, and has the right tools, lighting will appear as natural as sunlight. Of course sunlight doesn't always look good either.


Strobe Tube and Socket for Modeling Light

When we decide to add the ability to create and change light to our toolbox we move from taking a photograph, that is seeing a fine image, to making a photograph; that is, building it from scratch. This is a very exciting new way to make images, but it is also very frustrating. There are no automatic exposure systems to rely on. We will be using manual exposure all the time.

Further, we cannot see the light our camera will be recording. Even if we are in a studio, with no light sources but the modeling lights on the strobes, the light is not coming from the same source as the strobe light a camera uses.

Strobe History

Strobes evolved from spark gaps, basically two wires, close together - and a lot of electricity. If you get enough voltage high enough, the spark will jump the gap. If you use enough amperage, the spark will be bright enough to

expose film. If you stand between these wires it could be fatal.

Strobes are really just that same spark inside a tube filled with xenon gas. The gas reduces the amount of power you need to make the spark jump the gap. Because the electricity will jump the gap almost instantaneously strobes have an inherent ability to stop action. Dr. Harold Edgerton invented strobe tubes in 1931. Dr. Edgerton used them to examine extremely fast or brief phenomenon; his lights had a duration of around one millionth of a second, that is QUICK. It is a version of Dr. Edgerton's tubes we use today.

Safety

This history should make something very clear, that is strobe units use large amounts of electricity; consequently they are possibly hazardous. Please understand the above statement does not mean that these lights will make your electric meter go crazy, far from it.

Strobes take power delivered slowly from either wall current or batteries and store it up. Then they open the gates and let all the power go at once. It is this storage capacity that concerns us.

Strobe systems keep the power in electrical parts called capacitors. Capacitors can store power for YEARS. Unless you have special training never disassemble any strobe equipment; ever!

Let me make this clear, I have a certificate in Camera and Audio repair. I make my own cameras. I DO NOT WORK ON STROBE EQUIPMENT. I use Brent Hollister at Holly Enterprises (818)892-9020 when I need repair, he's great.

One more warning: It takes a doctor between 150 and 250 watt-seconds to defibrillate your heart (jump start your heart with the paddles on the table). Strobe systems frequently have between 1000 to 4000 watt-seconds. Do the math.

What the $%&&%^$ is a Watt-Second Anyway

It is a measure of power consumption, not light output. Which stinks because the manufactures use it to compare their products. So a product that is more efficient in its construction and reflectors doesn't get the benefit it should in the market place. It looks like a lower power product than it is. Oh, by the way, one watt-second equals one joule. I hope that helps.

Controls and Parts

First, a strobe has a tube filled with xenon gas, which is where the spark lives. That is where the light will come from.

In the simplest systems, it usually is a battery powered system; there will be very

little else to the head.

This unit has the sync terminal in the head. The rest of the unit is a control pack - with switches and battery.

Norman Head for 200B

The battery powered unit has an on/off switch and a power control on the pack which powers it. The sync terminal on my Norman 200b is on the head. That is all the simple ones have.

Norman 200 B Power Pack

Battery based systems are used primarily for location work. They generally have less power available than other systems. Their flexibility is their most important feature.

In a power pack unit, the head is still really simple, just larger. These heads also have what is called a modeling light. This is a separate bulb that helps the photographer to predict what the picture will look like. Modeling lights are of varied usefulness. Some, generally the brighter bulbs, can really help predict the shot. Lower power bulbs are harder to read. Personally, I do not rely on modeling lights. I use the LCD on the camera or a laptop to help me control my image.

Norman LH 2400 Head

With a power-pack system, the pack is large and heavy. The most important factor with a power pack is that most of the systems have a lot of power.

The Norman system I use has 2000 watt seconds, which is a lot of light. You can put this power into more than one head

Norman P2000D Power Pack

and change the levels on the various heads. It will power several heads. Mine can run 7 heads. It has different power outlets to control the power levels at the head. These power connections are very important because of the amount of electricity that runs through them.

Some may have a trim control, which will allow smaller adjustment of the power level. It probably has at least two separate controls for the output of the modeling lights. It has a sync terminal and some may have a built-in slave. Most units have all of the controls on the power pack not on the strobe heads. Oh yeah, the power-pack will have an ON/OFF switch on it.

In a monolight unit, the head plugs straight into the wall. So all the controls are on the head. It is currently the most popular of the three types of strobes. The heads are the biggest and heaviest of the three systems. It has a tube and a modeling light, like the other two but it has more.

First, a power control switch that controls how much light the unit will produce. Second, controls for the modeling light: ON/OFF, variable level & recycle. The variable level will enable you to adjust the modeling light to match the power of the unit.

If you have two units, one at full power and one at half power, you can set the modeling light of the half powered unit to half also. The recycle setting, for the modeling light, keeps the modeling light off until the capacitors in the unit have achieved full charge. Third, the unit will have a sync terminal. This allows the camera to trigger the strobe. It can also be triggered by a radio system. The unit may have a built in optical slave (new ones usually do). When this device sees a strobe go off, it triggers the attached strobe to fire. It does this so quickly that both lights appear in the same image; pretty neat! (We'll talk more about slave triggers later in the class).

These are available as an attachment for any strobe. Oh yeah, the strobe will have an ON/OFF switch for the unit.

Calumet Travelite 750

Back of the Travelite 750

Now you know how beat-up looking some of my equipment is. And you know I own a lot of gear from Norman. Please don't consider this as an unqualified endorsement. There is a reason and I'll probably get into it later.

Controlling a Strobe

The deal is first to understand what we want to control. There are two and a half things to control with any light source: 1) color, 2) size of light source relative to the subject, 1/2) angle of the light source relative to the subject (the bigger your light source the less critical this is). Color is relative to the other light sources with film and digital. With film it is also relative to the type of film you have in the camera.

If you have one bluish light and one reddish light, you can adjust your digital camera with software (or your film camera with filters) to shoot either of these lights as normal - but not both. That is what I mean by "relative to".

If you use a small light source, relative to your subject to make a shot, the light will be harsh, with sharp shadows. For instance, if you take a picture of someone's face in bright sun, the results will be harsh. Now I've been given to understand that the sun is quite large, but it's 93,000,000 miles away, so it's relatively small in the sky.

If you shoot the same shot on an overcast day the results are very different, no real shadows at all. In the sunny day shot, the position of the subject relative to the sun matters a lot. On an overcast day it hardly matters, so it half important.

Strobe Accessories

We will discuss this at greater length later, but I want to introduce the concept now. A small light source throws light that has bright reflections and has hard shadows; . This is called *hard light*. This light can define texture and add sparkle to a subject. There are several accessories designed to control this light: reflectors, barn doors snoots and grid spots. All of these control the placement of *hard light*.

Soft light is created by making the light source larger. This causes the shadows to be filled in by light from other angles of the light source. Soft light, if the source is large enough, can be like the light on an overcast day: the light comes from everywhere and there are no shadows. Accessories that create and control soft light are umbrellas, light panels and soft boxes. The softness of the light is in direct proportion to the size of the light source and the distance to the subject. By size of the light source I mean the lit surface the light hits or transmits through before hitting the subject. So a 60 inch umbrella is a light source that is a 5 foot circle and a 2X3 foot soft box is a 2X3 foot light source. Size is much more important than the way the light source is created.

Strobe Sync

Strobes have a duration of a very small fraction of a second. It is critical to get them to fire at the right time or the shutter will be closed. This is called "syncing the strobes". If shutter speed is too fast, part of the image area will be covered when the strobes fire. If the shutter speed is too slow, the existing light in the room will be added to your picture.

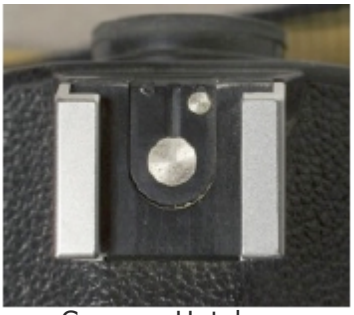
Syncing your strobes to your camera is one of the eternal annoyances. Problems include cords and misfires. A little background: sync is basically an electrical connection. When the first shutter curtain finishes traveling, it connects the two sides of the electrical circuit and this triggers the strobe. If the second shutter curtain has already started to travel when the first curtain finishes, you get a partial picture - since the second curtain is covering part of the picture.

Dodie Helps Out Again

This connection should be very simple, but there are a couple of reasons that it isn't simple.

First, the electricity in this circuit is not the actual power for the strobes, since that would damage the camera. It is a sync circuit that triggers the actual strobe, thus we have a switch triggering another switch triggering the strobes. Some older equipment uses a high voltage that can damage some modern cameras. Be cautious and research your cameras capabilities.

Camera PC Socket



Camera Hotshoe

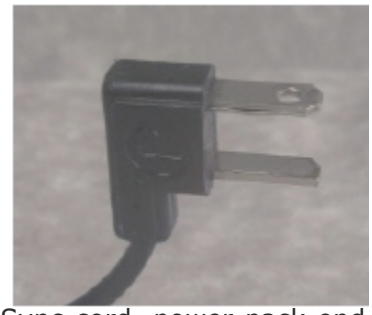
There are two places on a modern camera where the sync is located: in the hot shoe and in the PC terminal. The hot shoe (also called flash shoe) is usually on top of the camera and the PC socket, when it is there, is usually on the other side of the camera from the shutter release.

If you are going to connect your camera to the strobes with a wire you will connect a PC cord to the PC terminal of the camera and either plug the other end into the strobe equipment or plug the other end into an extension and then into the strobe. There are adapters that allow you to use a PC cord with a hot shoe. Unfortunately PC cords are delicate and often fail. Be sure to have an extra.

Most strobe packs use one of two plugs; of course this couldn't be standardized. Most, but not nearly all strobes use a .25X1.25 inch plug (looks like an old style headphone plug). The other common plug used is a regular household plug, just as you'd find on a lamp or a blender. The problem with the household plug is that if you have a momentary lapse of thinking processes you could plug your camera into the wall current. This would be very bad. I had an assistant do that once - very very bad!


PC Cord Tip


Guitar plug sync cord


Sync cord, power pack end

Chinese Radio Slave

An alternative is to use a radio transmitter to tell the power-pack or the monoligh what to do. This requires a sender that fits in the hot shoe and a receiver that attaches to the strobe or power-pack - in the same way a wire from the camera would attach.

The great thing is that there is no wire connected to the camera, which makes handling the camera easier. Also, there is no high trigger voltage to damage the camera; very nice.

So there are several kinds of radio slaves, units like the Pocket Wizard that cost between $150 and $300 or units made in China and sold on EBay that cost between $30 and $50.

Check them out at: http://photography.listings.ebay.com/ . I have the one of the units from EBay, it works very well. These units have the 1/4inch guitar jack and a pc terminal that you can attach to a pack that uses the household connector; of course you will need a household to PC adapter.

You may want to trigger more than one strobe: I often need a bunch of strobes. I'll be talking about how that works next week.


IMC Warehouse, original transparency

Recycling

Strobes take time to fill the capacitors with enough energy for the next pop. So the speed at which your strobe recycles is the speed at which you can shoot. There is a partial exception to this, if you are not using full power from your strobes, they recycle faster and you can often get a pop from them almost instantly if you are only using a small portion of the power in the capacitor.

Strobes powered by alkaline AA batteries are the slowest recycling units I've seen. On a new set of batteries, they may take more than 5 seconds to recycle; older batteries can take half a minute. 5 seconds is a long time when you are shooting a person, you can miss a lot of shots.

Solutions for the Canon 580 and the Nikon SB800 include nickel metal hydride batteries, somewhat faster, and external battery packs like the Quantum Turbo, which is a whole lot faster.

Monolights and studio strobes, as well as the more powerful battery units, have recycling times around 2 seconds. Even 2 seconds is sometimes too long. This is a good reason to have a more powerful strobe as it has a reservoir of power.

Project Making a Light Panel

The light panel, which I often refer to as a scrim, is one of the two best tools for manipulating light I know of. The other is a photo umbrella. We'll get to those next week.


Light Panel

You can buy these panels readymade, and, if you are the "somebody else do it" type, you may want to buy these; try Calumet or B&H. This is one of the easiest and most useful build it yourself projects.

By the way, this project is setup in inches and feet and yards because cotton fabric is sold in a 42 inch width in the United States, so I don't need to hem the fabric. If you wish to use another width of fabric please feel free to change the plan. The light panel is an excellent tool for making a large light source.

MATERIALS

- 3 pieces 10 foot PVC pipe 3/4 inch schedule 40 (that's the thick stuff)
- 4 pieces T connectors
- 2 pieces straight connectors
- 2 pieces corner connectors
- 4 pieces end caps
- 2 yards, plus a little white cotton broad cloth, 42 inch wide
- 1 foot elastic strip
- Glue, PVC glue, any PVC glue. Try to use the PVC glue outdoors.
- Glue, white wood glue something along that line.
- You can get all this stuff at Lowe's or Home Depot, or a bunch of

other places - it's not rare.

HOW TO ASSEMBLE

Cut the PVC in to the following lengths
2 pieces 42 inches
4 pieces 36 inches
2 pieces 6 inches
4 pieces 10 inches

ATTACH
Only glue a PVC connector to one side of pipe, except on the feet

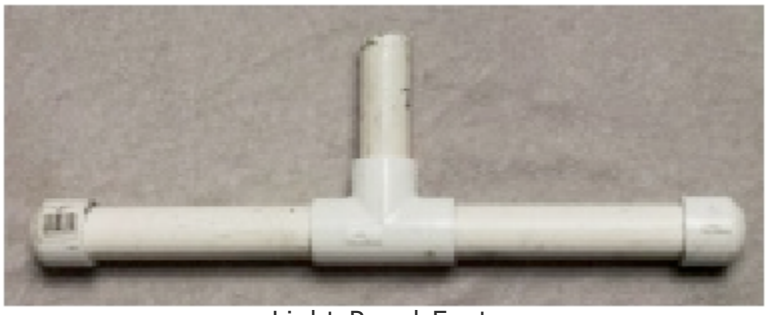
2 corner connectors to the same piece of 42 inch PVC.

1 straight connector to one piece of 36 inch PVC, make 2 of these. You should have 2 pieces of 36 inch PVC without any connectors and 2 pieces with one straight connector on each.

2 T connectors to one piece of 42 inch PVC. Glue the PVC into the hole that is at a right angle to the straight through hole.

If you have trouble with this, put the thing together without glue. It should be a rectangle 42 inches by 72 inches. When you are through, it should come apart easily to go into an equipment bag. You might try this with the feet also, before you use glue.

The feet will fit into the open holes on the second piece of 42 inch PVC.


Light Panel Foot

Take 2 of the 10 inch pieces of PVC and glue them into the straight through sides of a T connector. Glue an end cap onto each of these. Glue a piece of 6 inch PVC onto the open side of the connector; this will fit into the bottom of the frame you just made.

Now the fabric. This comes from a fabric store not a hardware store. You will want to finish up with a piece of cotton that is tight in the frame, so

measure the frame! Make your hems, on the top and bottom, with glue; this should enable you to use up any extra fabric. Cotton glues well, nylon doesn't, so if you use nylon you'll probably need to sew these ends.

Sew pieces of the elastic ribbon on each corner; this will hold it onto the frame.

Attaching cloth to frame

You have made a useful photographic tool. We'll see how useful in the coming weeks!

Project # 2: Making a Light Stand for a Clamp Light

This is a simple project, you just need a piece of plywood about 18X18 inches a couple of screws and a 6 or 8 foot piece of 2X4 or 2X2 inch stud. Screw the stud into the center of the plywood. Then attach your clamp light to the stud. You can also attach clamp lights to chairs and other things, but this stand might help.

Materials for Clamp Light Stand & Stand

Your Assignment: Photograph the Wig Head

PART ONE

Make a list, no really write it out on paper, of the kinds of photographs you want to make with professional strobe lights. Be specific and detailed:

- Head shots for actors in home studio
- Family portraits in other peoples' homes
- Business portraits on location

List your goals and upload them to the Q&A section of the class.

PART TWO

MATERIALS

Get two clamp lights from Lowe's, Home Depot or some other home supply store - you know, the cheap ones with the bowl reflector and the spring clamp that attaches to a convenient door or something. Other lights that are easy to position will do, but get something cheap as these are just tools for experimenting. Purchase two large wattage bulbs, probably from the same store as the clamp lights. Regular incandescent bulbs are better than compact fluorescent tubes, but the compact fluorescent tubes are usable.


Clamp Light

Buy a wig head from a beauty supply store. These are used to hold wigs; they sort of have faces. I want a Styrofoam wig head, not anything else. I don't like looking at pictures of wig heads, but they are really amazing tools for practicing with light. Do not get a wig. Please get a pair of reading glasses or other clear glasses and put them on the wig head. I want you to put these on the wig head so you have something reflective to work with. The white wig head show what light does to shape a subject so it is the best tool I know for lighting practice.

This is a lighting class, and we need to get a feeling for how to control light. These simple items, the clamp lights and the wig head, give you a sort of lighting laboratory where you can practice. Practice is part of the learning in

this class. Please shoot a lot of wig head experiments. You can upload the ones that you don't use for the assignment to the More Wiggy thread at Q&A. Keep in mind that I have had to critique thousands of wig head shots over the years, so it would be a great kindness if you didn't upload more that 2 wig head shots and 2 set-up shots to the assignment page.

The First Assignment

This is a hard light shot, that means a little light source, just the bulb inside the reflector. Please don't use an umbrella or other large light modifier. I want you to have a chance to see how hard light defines features. That means I WANT you to MAKE SHADOWS on the face of the wig head. I want the shadows to define the shape of the face and the features! Do not make an evenly lit image of the wig head, that will come next week.

Shoot 2 images of the wig head with the glasses and 2 set up shots. Remember the wig head is not a person, so you can make shots that wouldn't be good for a person. TAKE A SHOT OF EACH SET UP, even the ones you don't use for the assignment. You can use a phone camera for the set up shots. I want to see the shot of the wig head and the set-up shot that went with it - be sure to mark which shots go together. I expect you'll shoot a lot of these but choose the 2 you most want to have critiqued, and the set up shots to upload for the assignment.

Be creative; don't do the same lighting both times. Do this in a room where your clamp lights are the only significant lighting. You want to notice how the placement of your light affects the image. Please take notes on your set-up. In the beginning you will want to document all your projects, you do not have to be as detailed as the example.

Include some text with each shot about why you did this lighting. Keeping notes and set up shots, especially when you first start to work with light, will help you learn faster. If you don't send a set up shot with the wig head shot I won't critique it. I would very much like a detailed description of what you did on the assignment.

Wiggy Test

Lighting Diagram

If you'd like me to critique your assignment you can arrange that by payin $25 on my website. Please visit www.siskinphoto.com/workshop.php
Thanks!
John

Additional information about the assignment, from the class e-mail:
I have been teaching lighting for about twenty years. In all this time I have seen no tool better designed for lighting exercise than the wig head. If you have any suggestions for another tool, I would be pleased to here them. The wig head is neutral in color, has adequate detail, is widely available and is very inexpensive. As a consequence of this I have seen truly remarkable number of pictures of wig heads over the years. This has not increased my enthusiasm for wig head photos. Perhaps you can imagine the situation. So please only the assigned number of shots: 2 sets, including one wig head shot and one set-up shot in each set.

The second assignment is also about the wig head. A little clarification on the assignment: One set, shot and set up shot with just soft light and a second set with hard light and soft light. You may have trouble balancing the amount of hard light and soft light with clamp lights. One way to solve this problem is to put metal window screen (Lowes or Home Depot) over the hard light to reduce its power. You may find other ways to approach this as well. The idea is to use the characteristics of both kind of light to make a better picture of, well, a wig head.