

Basic Lighting

by Joe Dunfee Copyright 1998

For the purpose of this series I will assume that you are a person who is looking for ways to improve their performances, but that you are doing it on a limited budget. This means you will tend to make things yourself rather than purchasing professional equipment. But, I will mention some of the professional stuff you may consider.

I will focus on the technical descriptions of the lighting tools available and won't talk as much about the artistry of lighting in this article, even though the quality of your final production depends on it. Partly because I am not as much an expert in the art, but also because teaching artistry is much more difficult than teaching about technology. You may have a good sense of artistry already and can develop it as you practice it. When you see a professional level show, make notes of how they accomplished the mood of various scenes and how you might accomplish them with less equipment or scenery. College level text books on lighting can also help.

Purposes of lighting

- First of all, it is to make the performers visible... very basic and easily accomplished. However, from here on it becomes an issue of taste and artistry.
- The lighting also helps to focus attention and remove the audience from their surroundings. It can be an important part of creating the fantasy world you are creating for them.
- It can establish mood - the flashing lights of a rock style number instantly creates the "party" mood, while the dim blue lighting you have on your manger scene strongly declares the "silent night" mood. Note that lighting is only one of the tools available to you to establish a scene or mood. Painted sets, dialog, music, and other things are all theatrical "tools" that you can use. Remember that you don't need to use all possible theatrical "tools" in a drama - you only need to use your chosen tools well.
- To create the scenery itself. It is possible to actually use the lighting to project an image instead of using a painted set. Also, beams of light themselves will show up through fog or haze - and I use that effect with a special fixture to put out a fan shaped beam to depict a scene in the spiritual world. But I will save these "special lighting effects" for a future article.

Principals of Lighting

Here are some basic thoughts on lighting. One common basic lighting pattern is to have two sets of lights on each of the performance areas. One on the left, and one on the right. These are placed at approximately 45 degrees above the actor and 45 degrees to each side. And if you only have one lighting source, then just light from the center.

If you have the ability to color the light, it is common to put a warm color (pink, or amber) gel in the light on one side (called the Key light), and a cool color (light blue) from the other (called Fill). If a third light is available it is often placed above the actor and slightly behind (called Back).

After the above is done, it then becomes more of an art than a formula to follow. You might put only one light on a single actor center stage, and flood the rest of the stage with only blue light. A white light without the amber or pink gel will look stark and bright, which you will want in certain instances. You can also only light up the scenery behind an actor using lights that are directly above (or in the wings of, or even perhaps on the floor of) the stage. The actor (or puppet, magic prop, etc.) will then be seen only in silhouette. Of course, you can't make out any details on the actor or prop, but that can be useful to create some interest. Then you can light the actor from the front a short time later and more attention would be directed on the actor than if you simply would have put a single light on the actor.

The practice of using a follow spot placed on the ground level (or only a few feet above ground level) is really a very harsh kind of light. Being from so directly in front of the face, it doesn't allow the actor's face to form the shadows that help define what the face looks like. But it is the traditional lighting from Vaudeville days, and it is acceptable for a magician (or other solo act) to be in such a light at least some of the time.

Additional ideas from Ken Sly

Ken Sly offered several bits of advice for this column and also made the following lighting comments.

For Magicians, don't perform with back light unless you have rehearsed that way and are sure the light doesn't give away the secret.

If your lights are up full and you want to get "brighter" to punctuate the finale. Try dimming the lights at a speed of about 6% a minute and no one should notice the change. The eyes will adjust to slow changes and they will go undetected. Bring the lights back up fast and it will accent the ending.

Safety concerns

Before I set you all off plugging all kinds of stuff in, I should briefly caution you on potential electrical dangers. **DON'T OVERLOAD YOUR POWER CORDS, DIMMERS, OR ELECTRICAL OUTLETS!** If you don't know how to figure these things out, ask

someone who can! And if you regularly perform you show in various locations, remember your cords are more subject to wear than in your house - Check them regularly. If you use a lighting stand be careful to prevent people from knocking them over. I often ask an adult sitting by the lighting stand to not allow children to pull on them.

Household Fixtures and Bulbs

Most household fixtures tend to spread their light over a large area, but may be acceptable for your use. A quick stop at any home improvement store will reveal many options Clip on Lights, Track Lighting systems, Flood Lights. They are all viable options, but you will look more professional if you do more than just clip on one of those big aluminum work lights. In general, the low-voltage fixtures are not that useful - they don't put out as much light and aren't dimmable by regular dimmers. The halogen work lights on tripod stands are great buys (about \$29) But they are bright yellow and spread light out too much. However you might add "Barn doors" to improve them. Barn Doors are square pieces of metal that are attached to the sides and top of the fixture to block the light from going out the sides. Using the same principal, you can attach a "snoot" to a track light to block the spread of the beam. This can be made by riveting a tin can to the end of the fixture to extend its length. Be sure to paint the inside of it black so it doesn't reflect the light. Tract lighting fixtures may also prove useful for some people.

There are many bulbs on the market today for the home market. The wattage of the bulb is a good indicator of how bright it is. You will probably use the reflector kinds most. They are available in versions that have narrower beams of light, called a narrow flood or spot. But be aware that the bulbs also put out plenty of stray light aside from the focused beam. I mostly use the cheap regular old flood lights (called PAR bulbs) rather than the more expensive halogen kinds. They are also available in a few basic colors.

Professional Fixtures

A visit to a local theater supply house can educate you on the various kinds available. There are three basic kinds of fixtures...

Par cans are the simplest, and much like a tract light fixture, but they have a slot to put a "gel" - a transparent colored plastic. Their beam spread is quite wide. The cheap ones use household reflector bulbs. Others use a bulb shaped like a car headlight and are commonly available in 1,000 watt versions. Some have oval shaped beams that can be rotated. They are usually used to simply light or color a large area. Cost from \$19.

Fresnels have one lens in front of the bulb, and can restrict the beam of light a bit more. Their use is similar to the par cans, but they do have a tighter beam with less stray light. Cost from \$95 new.

Ellipsoid Spots are the first thing I would recommend to buy if you buy any professional lighting equipment - even just one because there is no home-made equivalent. This fixture has several lenses in it and is able to control light very well. The beam it casts has a sharply focused edge (if you focus it) and while it can be used to color a large area with light if it is far enough away, it is unique because it can be used to isolate a performer in a single pool of light - very useful. They also accept a "Gobo". A gobo is a piece of metal (or glass) with a pattern cut out of it. An ellipsoid spot will project this pattern onto the stage. Almost like a slide projector, but much brighter. The cheapest I have seen for a used ellipsoid is \$70. New ones are closer to \$200.

Follow spots are similar in design to an ellipsoid spot, but with a lot of extras. They sit on a special stand on the floor and are always used by an operator during a show who keeps it aimed on the performer. It usually has a very powerful bulb, as well as levers to change the colors and size of the beam, etc. Costs start at about \$800

Be aware that pricing on any professional equipment can vary widely... I have seen the same par cans from range \$20 to \$46.

Homemade Par Cans As simple as installing a socket in a tin can - ceramic bases are recommended. After some experimenting, I have found that it wasn't worth the trouble for me to do this. But plenty of people do this. Be sure to paint the inside with black paint to prevent stray reflections.

Controlling the Lights

Household wall switches and dimmers This is what most of you will use. The average home do-it-yourself-er can wire a few of these in an electrical box and provide outlets to plug your fixtures into. (remember my cautions about electrical overloading) I recommend the sliding dimmers over the rotating kind, because you can turn on several lights with one hand and can see immediately what level the switch is at. Also, be aware that the lower cost dimmers will not smoothly dim up from being off. Cost \$4 and up. I have been told that the more expensive Lutron slide dimmers are desirable even though they cost more, but have never spent the money to find out myself.

A trip to my local Home Depot revealed Plug in dimmers - these are, in essence, the same as wall switches and dimmers, but they have been pre-wired for you with cords already on them. One even was designed to be slid with your foot. Unfortunately none of the ones I saw had an easy way to mount them anywhere. But they are an option that requires no wiring, just plug it in..

Remote control I have made extensive use of the X-10 system (also sold by Radio Shack as "Powerhouse" modules) This was designed for household automation and it allows you to remotely control lights. You purchase a "module" for each light you want to control (about \$13). Then each light is plugged into one of these "Modules" and a dial sets the modules number. You also must purchase a controller to send the signals to the modules. I recommend the "Maxi-Controller" (R.S.#61-2672 \$25) because it allows you

to select several different lights at once, and then dim them at once. The other controllers all immediately turn on or off a light as soon as you press the button for it.

But before you get too excited, there is a major limitation. You cannot gradually bring up a light from being off. You must turn it on first and it comes on at full brightness - then you can dim it. I get around this by first turning everything on and then dimming them almost all the way down. Another challenge is that you have to control the lights by pressing buttons, and it can be confusing.

There is a cordless radio controller for X-10 (R.S.#61-2676 \$40). This gives you a hand held device that sends a radio signal to a receiver, which then relays the "ON/OFF" commands to the modules plugged into the wall. There is even a car-alarm sized version that will control two lights. I have used this system, which I gave to a person I was controlling the lights for - rather than learn his show and exactly when he wanted the spot on him, I allowed him to control the spot light himself with this remote control.

Costs \$13 per module + \$25 for controller.

If this X-10 stuff interests you, then contact your Radio Shack, which carries the basic stuff, or one of the following companies that carry everything.

HOME CONTROL CONCEPTS
(1-800-CONTROL orders, 1-619-693-8887 questions)
San Diego, California

HOME AUTOMATION SYSTEMS
(1-800-SMART-HM orders, 1-714-708-0610 questions)
Costa Mesa, California

Professional dimmers Most expensive of all the options. Two components make up the professional dimming system. The controller (usually with sliding knobs) and the actual dimming units. The two are connected with a low voltage cord. The dimming unit is plugged into an electrical outlet. Then finally, the lights plugged into the dimming unit.

Most controllers can store many different lighting scenes and recall them with the touch of a button. Of particular note to puppeteers, Lightronics makes a controller intended for bands. It is a tiny unit that sits on the floor and has foot switches to change from scene to scene. It will control up to 8 channels (no possibility of adding more) and has 5 scene presets, plus black-out, all on, and "chase" lights. The lowest price controllers cost about \$250, and dimming units about \$200 one four channel unit.

Of course, you can easily spend much, much more if you want to on more elaborate units. One man, who does a one-man biblical drama (Mac McConnell - the best I have ever seen!) is planning to set things up so the lights will run themselves from an audio signal on his sound track. It will utilize a SMPTE interface connected to a MIDI sequencer, that

will plug directly into his professional lighting board. This is probably way out of consideration for most of you since it will end up costing about \$1000 for the system. (not including the dimmer packs- he has about 26 lights and effects devices on 7 dimmer packs - that would be about \$1,400 for dimmer packs alone) But, this means he only has to travel with someone to run the sound for the show, the signal from the sound track will automatically run the lights for him - and leave me out of a job! Still, this is probably the best solution for him.

Recently I have purchased a Lightronics TL 1608 dimmer controller. It is a small unit that can control 16 channels of light and can store 8 scenes in memory. I think I paid around \$260 for it. I think for the price, it is a good value, but you need to evaluate how many lights you want to control before you commit to a small unit like this.

Final Comments

I want to again repeat the advice to practice in the lighting you will use for performance. This can be particularly important if you are lighting a show that kids are performing in. The bright lights in front, with that big dark space where the audience is seated can be quite intimidating. Also, the unexpected darkness off-stage may make movement difficult.

One theater company I know spent a few thousand dollars on lights, but found that the time spent transporting and setting them up was just not worth the effort. They finally purchased one of the work lights on a tripod base. They always keep this in their van, so that if they are in a situation without enough light, this is the solution. Not nearly as elegant as a full lighting system, but surely a lot easier to deal with!

Be a good steward of the money, time, and creativity that God has given you. Lighting can be a very useful tool in performing to help your show be better. But, it is also possible to go overboard. Use the wisdom God has also given you, to determine how much to do.

[Back](#)