

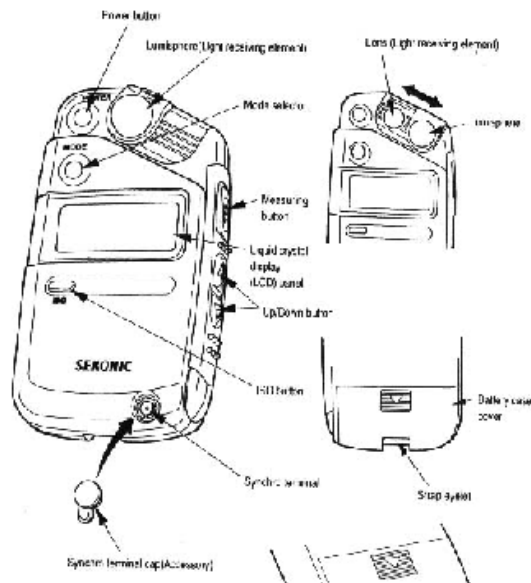
Notes on Lighting

The direction, height and intensity of the light source, and relative position of the camera onto the subject matter to be photographed can radically affect the appearance of the lighting. Learning good lighting depends on the ability to see light and levels of light. We see a broader range of gradient light than the camera can record; therefore, the difficulty is learning how to see light as the camera sees it. Light meters measure/analyze the light intensity changes relative to the changes that will record on the film. There are several different types of light meter readings: an averaging or reflective meter reading, an incident meter reading and a spot meter reading.

Light Quality

Specular light - Direct light, in which all rays travel in the same direction, is called specular light. It is also often called 'hard' light. The light source could be the sun, from a lamp or a flash.

Diffused light - Diffused light hits the subject matter from scattered or different directions. It is often called 'soft' light. It can be ambient light, refracted light, filtered light or bounced light.



Specular reflection - When the surfaces of the subject matter are reflective, the reflected light becomes a light source. They are also called specular highlights. Their position on the object is determined by the relative positions of the camera and original light source.

Cross-lighting - To amplify the texture of a surface, place the light source to cross the object at a close, low angle relative to its surface.

Meters

Averaging meters - In-camera light meters are averaging meters, unless designated as spot meters. The meter reading averages all the light levels in the viewfinder to an 18% grey. The

correct coupling of the shutter-speed and aperture designated by the meter will provide a well exposed negative.

Reflective meters - Most in-camera meters are reflective meters. Many hand-held meters are interchangeable from reflective to incident. Reflective meters measure the light reflected off the subject matter relative to an 18% grey (such as in a grey card - see also the zone system equivalent). Since the light reflects toward the camera, the meter lens (without the 'ball') should be directed towards the subject matter. Reflective readings are best used when you want to control the tonal values of the image. When you want to measure a specific area within the viewfinder, you must bring the meter closer to the subject matter to be measured.

Incident meters - Incident meters read the light levels falling onto the subject matter, regardless of its surface colour or value. Therefore, a grey card is irrelevant. The raised 'ball' (over the lens) considers the light in 3-D. The meter should be held facing the camera's lens, very close to the subject matter.

Spot meters - Spot meters are reflective meters that measure light in small, specific areas of the subject matter.

Lighting ratios and contrast

Lighting contrast is the difference between the light levels on the fully lit area of the subject matter relative to the light levels in the shadow areas. Or it can be the light levels of the subject matter relative to its background. Using an incident meter for each reading, they can be compared and can then be given as a ratio. If the full lighting is one stop more than the

shadows, it is twice as great as the shadow areas. The ratio would be 2:1. This would provide relatively modest, soft to even flat lighting for volume. The higher the ratio, the stronger the contrast.

Sample ratios:

<u>highlights to shadows</u>	<u>1 stop difference</u>	<u>2:1</u>
	<u>2 stops difference</u>	<u>4:1</u>
	<u>3 stops difference</u>	<u>8:1 (chiaroscuro type lighting)</u>

Lighting Glossary

The direction, height and intensity of the light source, and relative position of the camera to the subject matter to be photographed can radically affect the appearance of the lighting.

Specular Light - Direct light, in which all rays travel in the same direction, is called specular light. It is also often called 'hard' light. The light source could be the sun, from a lamp or a flash.

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Specular Reflection - When the surfaces of the subject matter are reflective, the reflected light becomes a light source. They are also called specular highlights. Their position on the object is determined by the relative positions of the camera and original light source.

Cross-lighting - To amplify the texture of a surface, place the light source to cross the object at a close, low angle relative to its surface.

Ambient Light/Available Light - Ambient, or available light refers to the light that already is present in the location where you plan to shoot. This light could be sunlight or indoor overhead lighting. Typically, when using studio flash units, the ambient light will be overpowered by the direct flash. However, it is important to factor in any ambient light in your flash meter readings to insure a proper exposure.

Bounce Lighting - Bounced light is an indirect light source, where the actual light is pointed away from that which you wish to illuminate, and bounced off of a reflective surface back towards your subject. This can be achieved in flash photography with reflector panels, umbrellas, and even reflective surfaces such as a wall or ceiling. Bounced light is used when you desire a softer, less harsh light quality than is produced with direct lighting.

Colour Balance/Colour Temperature (see also Kelvin) - The Colour Temperature refers to the colour of a light source, measured in Kelvin. The Colour Balance refers to the relationship between the colour of light and the film.

Diffused Light - Diffused light is softened light, with less shadows and more even coverage. A diffused light source is most commonly achieved by directing light through a translucent material, such as a diffusion shoot-through umbrella, a softbox, or a diffusion reflector panel.

Fill Light - In a lighting setup, the fill light refers to the light source which is used to "fill-in" the shadows cast by the main light. This source can be a flash unit, or simply a reflector that is directed on the subject to illuminate the shadowed areas and lessen the contrast.

Filter/Gel - A filter or gel for a flash unit is a thin piece of tinted or coloured gelatin placed directly over the light source to alter the quality of the light's output. Gels will physically change the colour of the light, whereas filters will modify its quality. Some examples include colour gels, warming filters, diffusion filters, UV filters, and neutral density filters.

Guide Number – A Flash Unit's Guide number tells you what aperture setting you will need on the camera for a given light to subject distance at a given film speed. For example, if you are using an ISO 100 film, you would use the ISO 100 GN and divide this number by the distance from light to subject to find the correct lens aperture. If, for example, the ISO 100 GN for your flash was 110, and your subject was 10 feet from the flash, you would use an f11 aperture. The Guide Number only has relevance when the flash is used direct.

Highlight/Hot Spot - Highlights or hot spots are very bright, well-lit and often overly lit areas in your setup, causing a very dense, dark spot on your negative. Hot spots appear when one area of your scene is overly lit, and can be avoided by diffusing or lowering the output of light on that area.

Hot Shoe - A hot shoe is a u-shaped mounting point, usually found on the top of 35mm SLR cameras. This feature provides a slide-in mounting of small, battery operated flash units. In addition, it provides an electrical circuit connection which fires the flash when the shutter is tripped. If your camera does not have the necessary PC connection to wire our flash unit sync cord, you can purchase a hot shoe adapter piece, which fits in your hot shoe, and allows the sync cord to be plugged into your camera.

Joules - Joules are a measurement of output, rated the same as true wattseconds. See wattseconds.

Kelvin (K) - The Kelvin is a unit of temperature measurement starting from absolute zero at -273 Celsius. Degrees Kelvin (or colour temperature) is used in colour photography to indicate the colour balance or spectrum of light emitted from a light source. If you were to heat a chunk of iron to 3000° Kelvin, the light emitted from the iron (a dull red glow) would be said to have a colour temperature of 3000K for the purposes of colour photography. Sunlight measures about 5500K and film balanced for sunlight (daylight film), will assure 'true' colour rendition for objects reflecting the sun. Photographic, or Xenon, flash creates a light source with a colour temperature of about 6000K.

Lens Flare/Light Spill -

With ambient and studio lighting, when light is directed or refracted into the camera's lens, this light is known as lens flare. Some photographers will allow light to be reflected in their camera's lens for an intended glowing effect, but normally light spill is undesired. When using studio lighting to illuminate your subject, you can eliminate light spill by position your flash unit and accessories to not direct light back into your camera.

Main Light - The main light in a lighting setup is the primary light used. This primary light source is typically the brightest in your setup, casting the most prominent shadows.

Monolight - The terms 'monolight' and 'flash unit' are often used interchangeably. A monolight is self-contained flash system that incorporates the power supply and flash head in one package. This term is used to distinguish these systems from 'power pack' systems where the power supply and flash head are separate and are connected using a heavy duty, custom cable. Monolights draw their power directly from standard wall outlets.

Recycle - When you fire your flash unit, it releases all of the energy stored in its flash capacitors

in order to emit the flash of light. Before you can fire the unit again, the capacitors must have time to recycle, or build up enough energy in the capacitors in order to fire again. Fast recycle times are important for rapid shooting, as you can take shot after shot without pausing to wait for your flash unit to keep up.

Slave - A flash unit is said to be a slave flash when it is set up to fire by detecting the flash from another (master) flash unit in a multi-light setup. This allows multiple light setups to be operated with only one light synchronized (wired) to the camera. As many slaves as necessary can be used in a set-up.

Sync - The sync connection in a flash system connects to the camera body, either to a PC connector or through the hot shoe. This circuit is used by the camera to fire the flash at the precise moment that the shutter has fully opened and before it begins to close to successfully capture the full light burst from a flash set-up.

Wattseconds (Joules) – A wattsecond is a measure of electrical energy used in flash systems to indicate the amount of energy in the flash capacitors. Since this is only a measure of electrical energy, and does not take into account considerations such as flashtube efficacy, or flash capacitor/flashtube energy transfer efficiency, it is not necessarily a good number to comparatively assess light output. See also effective wattseconds and Lumenseconds.

Positioning the Lamps

Copy-work and 2-D documentation - This type of camera work requires exact, even lighting (flat, no shadows). The lamps are to be placed at 45 degrees so the light diffuses evenly over the whole surface. The height of the lamps should be mid-height to the subject matter. Metering should measure the four corners and the centre. Any variance beyond a ½ stop will be visible in the print or slide.

Lighting for volume - Shadows are necessary to describe volume, so the following adjustments to the 45 degree angle must be made relative to the harshness or softness of the shadows. The following is a very basic 'rule of thumb' to be adjusted to the aesthetics of the image. One lamp should remain dominant. It is generally brought closer to the camera position so the highlight is still angled, but closer to the centre. It will give a softer shadow to the one side and a stronger one to the other. Often this lamp is raised to cast shadows downwards. If you have a second lamp, it is to function as a fill and to reduce (not eliminate) shadows on the object. To reduce intensity, it should be moved further away from the object. If you would like to bleach out shadows behind the subject matter, place a third lamp to shine on the backdrop. If you would like to brighten the edge of the shadow, a bounce screen can be added. For portraiture, an optional high, bright overhead lamp can be angled onto the hair. The closer the lamps are to the subject matter, the stronger the shadows.

Umbrellas - To diffuse the harshness of the light and its shadows, studio umbrellas can be used with your same lighting configuration. They are reflective, and are meant to bounce the light source onto the subject matter. With the lamps in the same position, turn them 180 degrees to the subject matter, so the umbrella curve now faces the subject matter.

Lighting ratios and contrast - Lighting contrast is the difference between the light levels on the fully lit area of the subject matter relative to the light levels in the shadow areas. Or it can be the

light levels of the subject matter relative to its background. Using an incident meter for each reading, they can be compared and can then be given as a ratio. If the full lighting is one stop more than the shadows, it is twice as great as the shadow areas. The ratio would be 2:1. This would provide relatively modest, soft to even flat lighting for volume. The higher the ratio, the stronger the contrast.

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ELECTRONIC FLASH PHOTOGRAPHY

ITEMS REQUIRED FOR STROBE PHOTOGRAPHY

Power Pack: 800 watts/sec , or 1200 watts/sec, or 2400 watts/sec.

Light Heads (fan cooled, unless the power pack is 800 watts/sec)

Umbrellas

Power Cord

Sync Cord

AC-PC Cord with adaptor for hot shoe (most digital cameras require this; check with Paul)

SAFETY PRECAUTIONS

Make sure that the power switch and the model light switch on the power pack are in the OFF position.

Plug the power cord into the front end of the power pack.

Attach the sync cord. One end attaches to the AC-PC cord; the other to the sync outlet in the power pack.

Set up the light heads. Wrap the cords around the stands so that the cords lie flat on the ground.

Connect the cord to the power pack. The side of the power pack has a diagram showing you how to control lighting ratios.

Turn the power pack and the model lights on.

Check to make sure that the fan in the light heads turns on, and that the modeling light is functioning.

Set your camera to the "X" setting for flash.

NEVER unplug cords from the power pack before turning off the power switch and the model light switch.