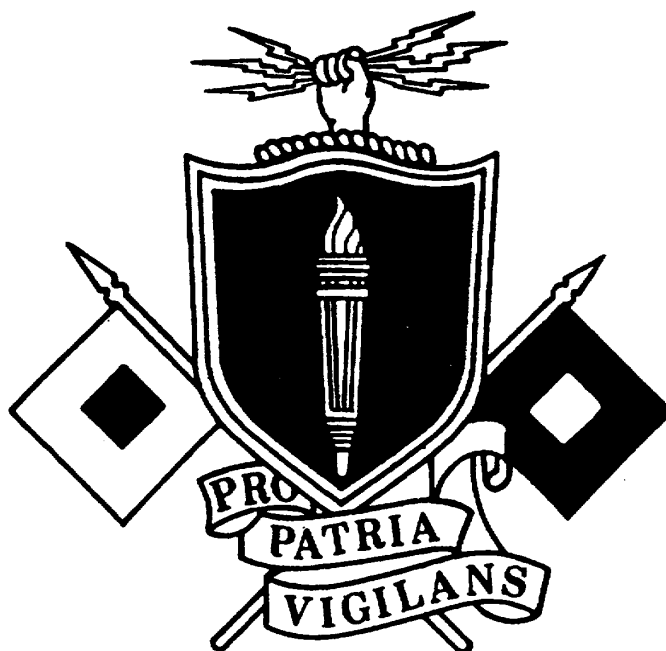


BASIC TELEVISION LIGHTING TECHNIQUES



THE ARMY INSTITUTE FOR PROFESSIONAL DEVELOPMENT
ARMY CORRESPONDENCE COURSE PROGRAM

**A
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P
D**

**READINESS /
PROFESSIONALISM**



**THRU
GROWTH**

US ARMY AUDIO/TELEVISION SPECIALIST
MOS 84F SKILL LEVELS 1 AND 2 COURSE

AUTHORSHIP RESPONSIBILITY:
SSG David Boyer/SSG Tony Summers
US Army Element
Lowry AFB, Colorado

BASIC TELEVISION LIGHTING TECHNIQUES

SUBCOURSE NO. SS 0549-7
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US Army Signal Center and Fort Gordon
Fort Gordon, Georgia

Three Credit Hours

GENERAL

The Basic Television Lighting Techniques Subcourse, part of the Audio/Television Specialist, MOS 84F Skill Level 1 course, is designed to teach the knowledge necessary for performing tasks related to lighting techniques in the studio and in the field. Information is provided on several tasks which are performed at increasing levels of difficulty at Skill Levels 1 and 2. The subcourse is presented in three lessons, with each lesson corresponding to a learning objective as indicated.

Lesson 1: DEFINE BASIC TELEVISION LIGHTING TECHNIQUES IN THE STUDIO

TASK: Define studio lighting techniques for a television production, define lighting, three-point lighting, four-point lighting, and describe the lighting equipment used in television.

CONDITIONS: Given information and illustrations relating to studio lighting techniques.

STANDARDS: Demonstrate competency of the task skills and knowledge by responding correctly to 70 percent of the multiple-choice test, covering definitions of lighting, three-point lighting, four-point lighting, equipment used and different studio lighting techniques.

(This objective supports STP tasks listed at the end of this section.)

Lesson 2: DESCRIBE MEASUREMENT OF STUDIO LIGHT WITH A LIGHT METER

TASK: Describe light meters, their function and techniques of using light meters.

CONDITIONS: Given information and illustrations relating to light meters, their function and proper technique.

STANDARDS: Demonstrate competency of the task skills and knowledge by responding correctly to 70 percent of the multiple-choice test covering descriptions of light meters, their functions and techniques.

(This objective supports STP tasks listed at the end of this section.)

Lesson 3: DEFINE BASIC LIGHTING TECHNIQUES IN THE FIELD

TASK: Define lighting techniques in the field, define equipment used, field lighting techniques and the difference between field and studio lighting techniques.

CONDITIONS: Given information and illustrations relating to field lighting techniques.

STANDARDS: Demonstrate competency of the task skills and knowledge by responding correctly to 70 percent of the multiple-choice test covering field lighting techniques of a television production.

(This objective supports STP tasks listed at the end of this section.)

THE OBJECTIVES FOR THIS SUBCOURSE SUPPORT STP TASKS:

113-577-1044	Set Up Studio Lights for a Television Production
113-577-1045	Connect Studio Lights to Patch Board/Dimmer Control Board (Electrical Sources)
113-577-1046	Perform Measurement of Studio Light Intensity

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Whenever pronouns or other references denoting gender appear in this document, they are written to refer to either male or female unless otherwise indicated.

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INTRODUCTION TO BASIC TELEVISION LIGHTING TECHNIQUES

Lighting for studio and field productions is critical. Lighting is both an art and a science. Not all rules of studio lighting apply to field lighting for a television production. Portable equipment can be used entirely for field productions. An Audio/Television Specialist requires knowledge in the techniques of lighting. The soldier should be flexible in applying techniques to the production at hand.

LESSON 1
DEFINE BASIC LIGHTING TECHNIQUES IN THE STUDIO

TASK

Define basic lighting techniques for a television production. Define lighting, 3-point lighting, 4-point lighting, and describe the lighting equipment used in television.

CONDITIONS

Given information and illustrations relating to studio lighting techniques.

STANDARDS

Demonstrate competency of the task skills and knowledge by correctly responding to 70 percent of the multiple-choice test covering definitions of lighting, 3-point lighting, 4-point lighting, and the lighting equipment used.

REFERENCES

None

Learning Event 1:

DEFINE LIGHTING, LIGHTING PRINCIPLES, TECHNICAL AND AESTHETIC REQUIREMENTS FOR LIGHTING, 3-POINT LIGHTING, AND 4-POINT LIGHTING

1. Lighting is an art. Clever lighting manipulates the audience and their perception. This would include their perception of size, shape, color, and weight. Lighting can enhance the illusion of three dimensions. Poor lighting can result in footage without character (boring). Good lighting is critical to a quality television production.

2. Like the human eye, the television camera needs light in order to "see" and function properly. Unlike the human eye, the television camera is much more demanding as to the amount of light, the color of the light, and its relative harshness and direction.

a. Although we may see quite well with only a flashlight as an illuminating source or under extremely bright sunlight, the camera may not operate correctly under these conditions. The flashlight may not radiate enough light for the pickup tube to give off sufficient electricity. The resulting television picture lacks signal strength and consequently suffers from excess video noise, often called picture snow. Bright sunlight, on the other hand, may be too much light for the camera to handle. At best the picture looks washed out; at worst, the superabundance of light can destroy the camera pickup tube.

b. A lamp, which appears to the eye to give off a perfectly white light, may look so red to the camera that the resulting picture has a reddish tint on the color monitor (television set). Another lamp may produce light that looks to the camera quite bluish, although our eyes again perceive it as normal white light.

c. A harsh light, or a light coming from an unusual angle or direction, may produce shadows that conceal, rather than reveal, the actual shape of an object.

3. Television lighting technique is defined as the adjustment and manipulation of light to meet the technical requirements of the camera while creating a pleasing television picture. Controlling lighting for television is critical. To explain how we control lighting, we will further discuss the following areas:

a. Types of light and illumination.

b. Color temperature.

c. Technical requirements.

d. Aesthetic requirements.

4. As in all photographic arts, in television you encounter two basic types of light and illumination. The two types of light are directional and diffused. The two types of illumination are outdoor and indoor.

a. Directional light illuminates only a relatively small area with a distinct beam. It produces a well-defined shadow and produces fast falloff, which means that the light area changes rather abruptly into a dense shadow area. To achieve directional light we must use spotlights.

b. Diffused light illuminates a relatively large area with a wide indistinct beam. It produces soft, undefined shadows and causes slow falloff. The lighting instruments used to emit diffused light are called floodlights.

c. Outdoor illumination is primarily accomplished by the most reliable source we have, the sun. But, the sun does not always emit the same type of light. On a cloudless day, the sun emits a highly directional light, like a spotlight. On an overcast day, the clouds act as diffusers and change the sun into a diffused light source, like a floodlight. This light is nondirectional (diffused) and has a slow falloff. Although we use special light sources and reflectors to adjust the lighting as much as possible when outdoors, we generally have little control over outdoor illumination.

d. Indoor illumination will almost always require the use of lighting instruments. If the room is partially illuminated by available light (i.e. light coming through a window) the job of matching the amount and the two types of illumination becomes even more challenging. The amount and types of lighting instruments used varies from one handheld light to complete lighting grids that allow total and precise control over the light.

5. Color temperature is the standard presently used in television to measure the relative reddishness and bluishness of "white" light. A fluorescent bulb actually emits a blue-green tint while a candle emits a reddish tint. This difference can be measured precisely and expressed in degrees kelvin. Lord Kelvin devised this scale by heating a carbon filament, which he considered to be completely light absorbing and therefore a black body, from absolute zero to various degrees centigrade. He observed that the hotter the black body got, the more bluish the emitted light became. Conversely, the more the temperature dropped, the more reddish the light became. If he heated the filament to 3200K (3200 degrees from absolute zero centigrade) it emitted a fairly white light. Therefore, we consider 3200K the standard for "white" indoor light.

a. Outdoor illumination is bluer than indoor light and, therefore, has a different color temperature. The standard color temperature outdoors is about 5600K as measured on a midsummer day at high noon in Washington, DC.

b. Most studio lighting instruments are rated as 3200K, assuming they receive full voltage. Lighting instruments that are used to simulate or augment outdoor illumination have bulbs that are rated at 5600K. We will discuss these lighting instruments in more detail in a later section of this subcourse.

6. Technical lighting requirements are to provide enough light so that the camera can "see well" and to limit the contrast between highlight and shadow areas. In order to understand technical requirements, it is necessary to break them down into two separate areas, operating light level (base light), and contrast.

a. In order to make the camera see well, that is, so the pictures are relatively free of video noise and lag, a minimum operating light, called base light, must be established. Base light is the overall light level on a set or event area.

(1) Base light can be achieved in two distinctly different ways. The first method is to establish a highly diffused illumination through the use of floodlights. The specific areas requiring lighting (people, specific set areas, etc.) could then be added to the base lighting.

(2) The second and most preferred method is to light those areas requiring specific lighting first, then fill in the harsh shadow areas with floodlights. By using this method, very little additional light will be required to meet the base light requirements.

(3) On remote productions, where time and lighting equipment are limited, using the first method of establishing base light is the more practical of the two.

(4) The level of intensity required for proper base light varies with the type of camera used. However, if 250-foot candles are used as a standard light intensity level, practically any camera on the market today will function properly.

b. The television camera can tolerate only a limited difference between the lightest and darkest areas of a scene if it is to show the subtle brightness differences in the dark picture areas, the middle range, and the light picture areas.

(1) When working with contrast, the primary concern is the amount of light reflected by the colors and various surfaces reflecting the light, rather than the amount of light being emitted by the lighting instruments themselves. For example, a white object, such as a refrigerator, will reflect a great deal more light than a dark-blue velvet cloth, even when they are illuminated by the same light source. Further, if you should place a highly polished piece of brass on that same velvet cloth, you would probably have too much contrast without even beginning to light.

(2) The difference between the lightest and darkest parts of a picture is known as the contrast ratio. For most color television cameras, the primary contrast ratio is 30:1. This means that the lightest part of the picture area is 30 times as bright as the darkest picture area. If the contrast ratio is more than 30:1, the camera can no longer reproduce the subtle brightness differences in the lightest and darkest parts of the picture area.

(3) There are three general ways to keep the contrast ratio within television's 30:1 limits. If you follow these guidelines, you should be within the contrast limits of your equipment.

(a) Stay aware of the level of reflectance of objects. A highly reflective object needs less illumination than a light-absorbing object.

(b) Avoid high brightness contrasts in the same shot. For example, instead of placing a highly polished piece of brass on a dark-blue piece of cloth, place it on a more light-reflecting piece of cloth.

(c) Lighten the shadow areas with fill light. This will help to show some of the detail that otherwise might be lost because of too high a contrast ratio.

7. Aesthetic requirements pertain to the artistic value of a scene. To meet these requirements the following points must be considered:

a. Producing a pleasing picture by the proper distribution of light and shadows.

b. Support the illusion of reality such as moonlight, sunlight, or other similar settings.

c. Help bring out the depth and dimension of a scene.

d. Add beauty and glamour to the talent or subject.

e. Enhance the actors' looks by bringing out the good side of their features and playing down objectional ones.

8. It may seem an incredibly difficult task to light for television given all the considerations. However, if the lighting technician follows proven techniques of photographic lighting, the job becomes much easier than originally thought. Let us take a look at these techniques. Television, like all the photographic arts, is subject to photographic lighting principles. Three-point lighting is the most basic of these principles.

a. Three-point lighting, also known as triangle lighting, consists of three main light sources (as its name suggests). These three light sources are known as the key light, the back light, and the fill light (fig 1-1). These lights are positioned in such a manner to most effectively perform their function.

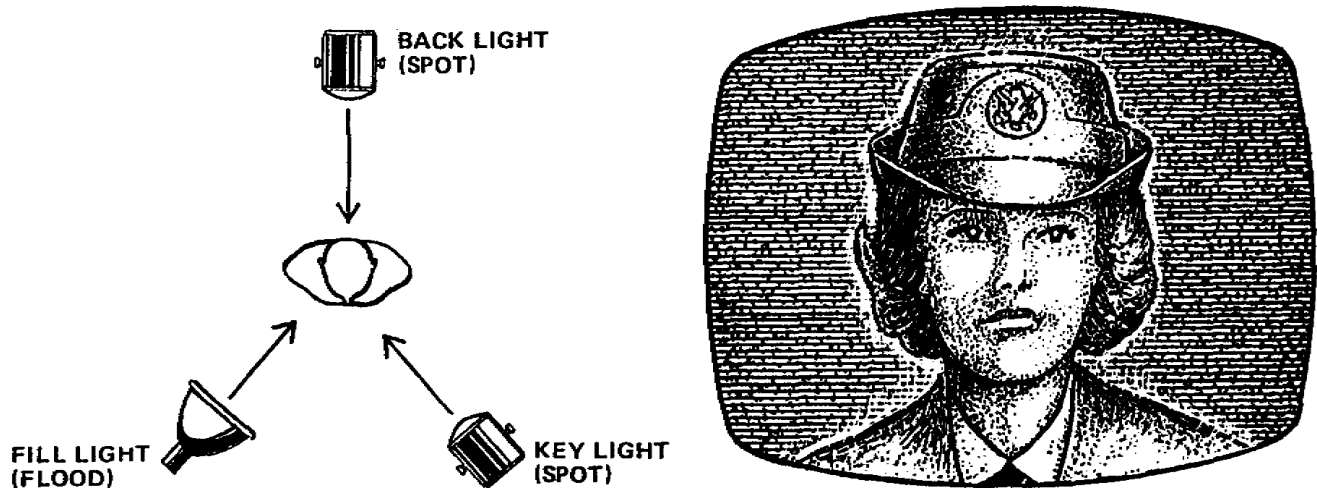


Figure 1-1. Three-point lighting

b. When setting up three-point lighting, the primary source of illumination is the key light (fig 1-2). Its main function is to bring out the basic shape of an object. In order to do this, the key light must produce some shadows. A spot light is generally used as the key light. This allows a great deal of directional control over the light.

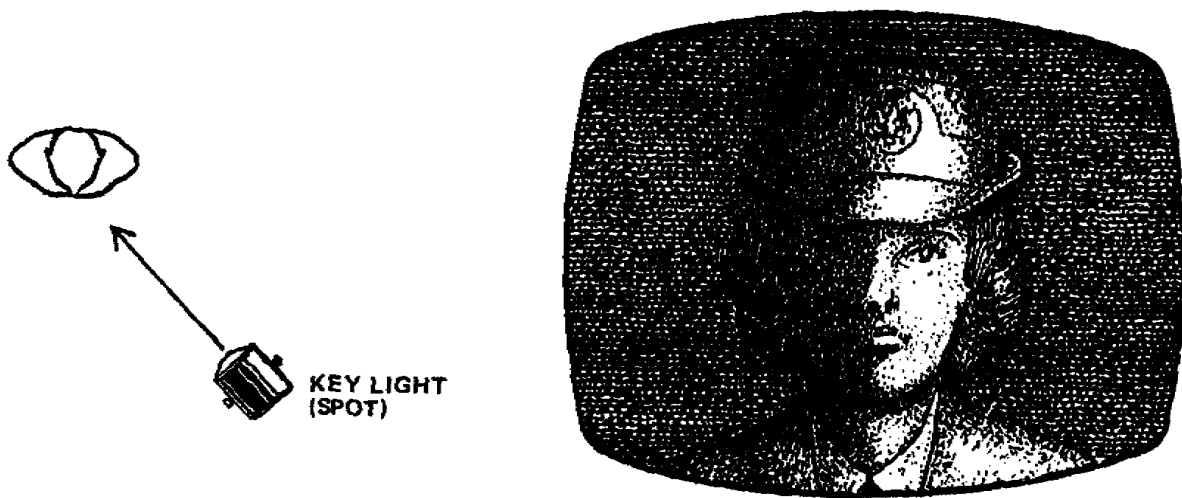


Figure 1-2. Key light on person

c. When lighting is natural, the light is coming from above. Therefore, the key light is placed above and to the left or right front side of the subject being lighted. This is from the camera's point of view (fig 1-2); note the deep shadows present on the side of the face opposite the key light. When the key light is set, the object will have very dark shadows on the side opposite the key light.

d. The back light (fig 1-3) has several important functions. It helps to distinguish between the shadow area of an object or subject and the background. The back light also emphasizes the outline of the object, separating it from the background. Thirdly, the back light adds dimension and gives sparkle to a scene.

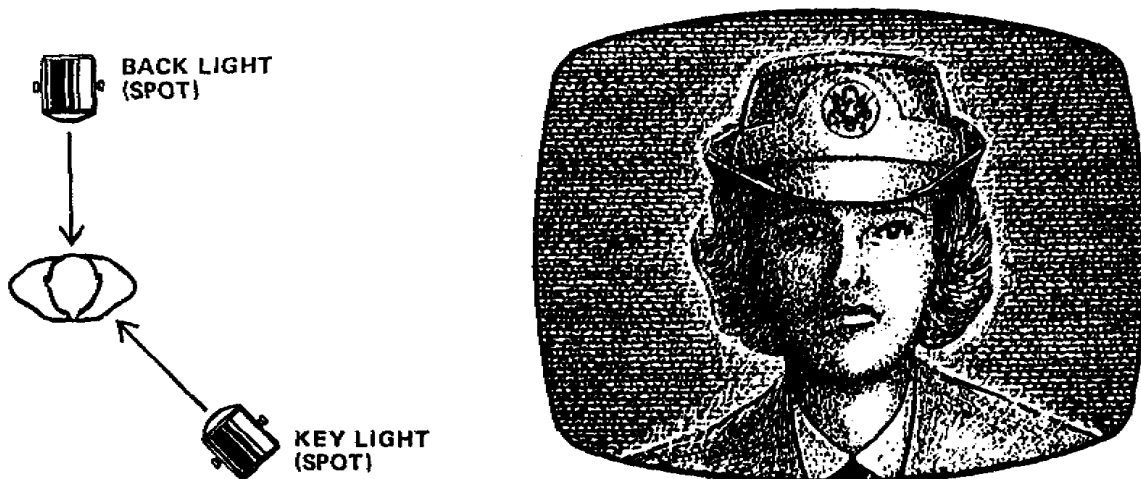


Figure 1-3. Back lighting a person

e. Generally, it is best to position the back light directly behind the object or subject being lighted (opposite the camera). However, if due to studio size constraints, the back light must be placed to one side or the other, it is best to keep it as near to the rear of the object being lighted as possible.

f. A more critical problem is controlling the angle at which the back light strikes the object. If it is positioned directly above the object, it becomes a toplight, which is undesirable. If it is placed too low, the back light may shine into the camera lens causing flare and halo. This could also damage the camera pickup tubes. In general, lighting angles of 45 degrees are considered ideal for normal lighting situations.

g. Like the key light, a spotlight is generally used as the back light. Once again, this allows a great deal of directional control over the light.

h. Once the key and back lights are set, the dimension of the object should be shown quite well. However, the falloff from light to dark areas is extremely fast. Also, the shadow area of the object is so dense that the camera is unable to see any object detail within this shadow area. Consequently, it becomes necessary to slow down the rate of falloff through the use of a fill light (fig 1-4).

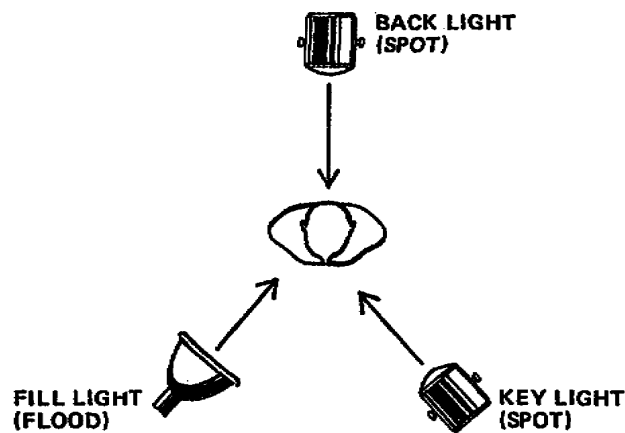


Figure 1-4. Fill light

i. When placing the fill light, care should be taken not to eliminate all shadows because this eliminates the three-dimensional effect we are trying to create.

j. The ratio of key light to fill light is best, if it is about 2:1 (fig 1-5). That is, the key light is twice as bright as the fill light. This will reduce shadow density but still maintain enough shadow area to complement, rather than eliminate, the three-dimensional effect.

LIGHTING BALANCE

	Too bright	Too dim
Key light	Back light less effective. Skin tones are high. Facial modeling lost. Lightest tones tend to be overexposed. Gives a harsh effect.	Back light predominates and often becomes excessive. Darker tones are underexposed. Possible muddy effect
Back light	Excessive rim light. Shoulders and tops of heads. Excess back light causes key light to appear inadequate.	Two-dimensional picture which lacks depth. Subject and background tend to merge together.
Fill	Modeling from key light reduced and flattened.	Excessive contrast. Subject too harshly modeled.

Figure 1-5. Lighting ratio

9. Four-point lighting. Although three-point lighting yields a very good result, it is somewhat restrictive if more than one camera angle is desired. Therefore, an alternative lighting technique, known as four-point lighting, is also used. Four-point lighting uses four spotlights (fig 1-6). The illumination from these lights should strike the object being lighted at approximately a 45-degree angle from above.

a. Along with allowing greater camera angles, the four-point lighting technique is simpler to set up than three-point lighting. However, the illumination from four-point lighting is very flat (low contrast ratio).

b. The lighting ratio for four-point lighting is 1:1 for all the lights used. This means that all the lights are illuminating at the same intensity.

10. Methods of eliminating shadows.

a. Regardless of how well you light or which lighting principle you use, shadows are going to be cast on areas of the set. Usually, with careful planning and lighting adjustment, these shadows will fall in areas that the camera will not "see"; that is, areas of the set that we, as the production crew, will not use as part of the "on camera" shot. Furthermore, when lighting a set, additional background lighting must be added to illuminate the remaining parts of the scene that do not require three- or four-point lighting; i.e., the flats, props, etc. By adding this background light, the shadows cast by other lighting instruments are diluted to the point where they are no longer a problem.

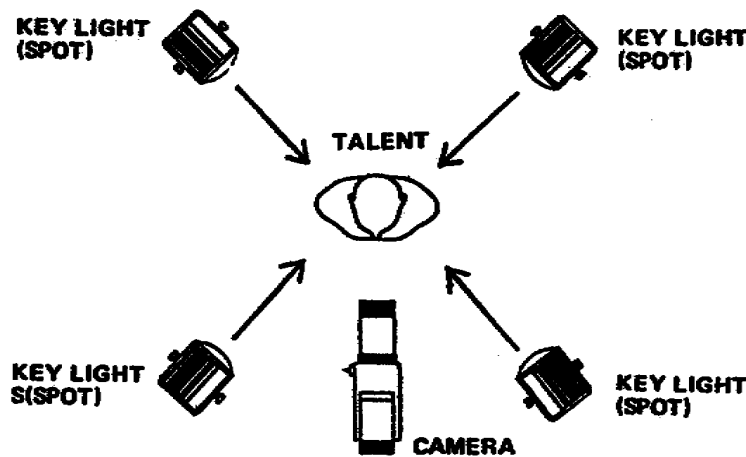


Figure 1-6. 4-point lighting

b. One problem, however, cannot be so easily solved. That is the problem of shadows cast by the boom microphone. If a boom microphone is going to be used, careful coordination between the boom operator and lighting technician is required to ensure that the boom does not cast shadows on the set area that is "on camera."

11. Special lighting techniques. Many studio productions require very specialized lighting in order to set the desired mood or nature of the event. The four most common special lighting techniques are cameo lighting, limbo or silhouette lighting, colored background lighting and chroma key lighting.

a. Certain television shows, especially those of a dramatic nature, are staged in the middle of an empty studio against an unlit background. This technique, where only the performers are highlighted against a dark background, is commonly known as cameo lighting.

(1) All cameo lighting is highly directional and is achieved entirely with spotlights. In small studios, the background areas are carefully shielded with black, light-absorbing draperies from any kind of distracting spillage of light.

(2) Although cameo lighting was a highly effective technique in monochrome television, it is rather difficult to handle in color. The major problems are high contrast, dense shadows, and the low baselight levels, all adverse factors to good color lighting. However, in certain circumstances, cameo lighting can be highly effective.

b. The lighting for a silhouette effect is exactly opposite to cameo lighting. In silhouette lighting, you light the background but leave the figures in front unlighted. Silhouette lighting shows only the contour of objects and people, but no volume and texture. Obviously, you light only those scenes in silhouette that gain by emphasizing the contour of things.

(1) You can also use silhouette lighting for concealing the identity of a person appearing on camera.

(2) In silhouette lighting, you use highly diffused light (usually from scoops with scrims or soft lights) to get the background evenly illuminated.

c. Color background lighting. To change the colors of the set background, you can use various color gels to add or change the color of the background.

(1) For example, if you want a background of an even red color, you would "gel" all the background scoops with red colored gels. If you wish to break up your neutrally-colored background, you could gel a few background spotlights with the appropriate blue-colored gels.

(2) By using several sets of background lights (several instruments grouped together) with different color gels for each set, you can easily change background colors by dissolving from one set (on group dimmer 1) to another (on group dimmer 2).

(3) When lighting the background at a set, it is best if the illumination for the background comes from the same general direction as the key light. Further, the background light should be about half as bright as the key light (key to background ratio 2:1).

d. The chroma key set area consists of a colored background (normally blue) and the foreground area, such as a newscaster's desk or interview chairs and table. The blue background is used for chroma key matting. That is placing the picture from another source into the scene electronically. Wherever the color blue is within that scene, the picture would be inserted.

(1) The most important aspect of lighting the chroma key set area is even background illumination. In order to achieve an optimally effective chroma key matte, (electronically supplied background image), the blue background must be lighted with highly diffused instruments, such as soft lights or scoops with scrim attachments.

(2) If there are hot spots (undesirable concentrations of light in one spot) on the blue background or unusually dark areas, the matte looks discolored, or worse, has a tendency to break up. When lighting the foreground set, make sure there are no spotlight beams hitting the background area so that you can preserve the evenness of the chroma key background illumination.

Learning Event 2:

DEFINE AND DESCRIBE STUDIO LIGHTING EQUIPMENT

1. In order to accomplish studio lighting, we must have equipment available that is functional and easy to use. Great strides have been made over the years to improve the reliability and operational ease of lighting equipment. Studio lighting equipment is defined as the lighting instruments and accessories necessary to accomplish studio lighting.

2. Simply stated, a spotlight or "spot" is a device which focuses light in a narrow beam. Spots use a movable reflector device to make the beam narrow or wide, although its beam, even at its widest point, is still not as wide an angle as a floodlight.

a. The fresnel spotlight light is by far the most common and most widely used spotlight in the television studio. This type of spotlight uses a glass lens in front of the housing. The glass lens consists of concentric grooves or steps on its front surface which forms the light into a soft-edged beam as shown in Figure 1-7. Within the fresnel spotlight, the lamp and reflector position are adjusted by a crank and screw system. This allows the light beam to be made broad or narrow as desired.

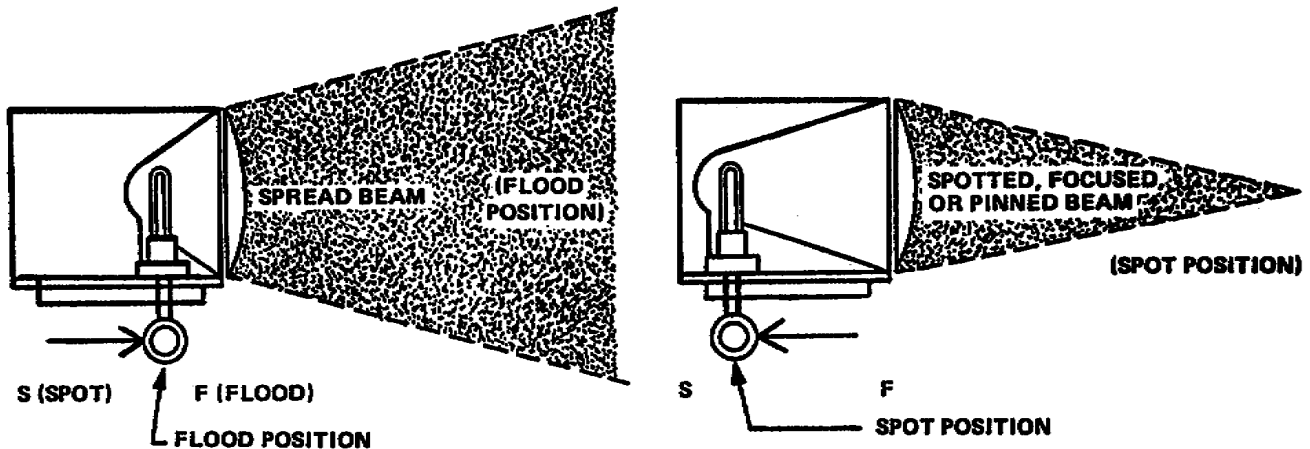


Figure 1-7. The fresnel spotlight

b. The second type of spotlight we will discuss is the ellipsoidal spotlight (fig 1-8). This lighting instrument produces intense, sharply defined light beams. The ellipsoidal spotlight is used primarily for special effects lighting. For example, if you want to create "pools" of light reflecting off the studio floor, the ellipsoidal spotlight would be the instrument to use. Even when the fresnel spotlight is in its focused position, it cannot emit as sharp an outline as the ellipsoidal.

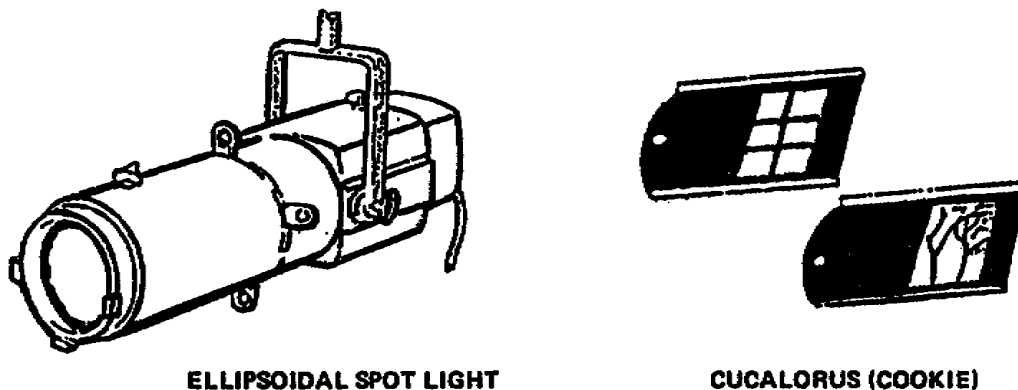


Figure 1-8. The ellipsoidal spotlight

(1) The ellipsoidal spotlight can also be used as a pattern projector. In this case, the ellipsoidal spotlight has a slot in its housing next to the beam-shaping shutters which can hold a metal pattern called a cucalorus or more simply a cookie. The ellipsoidal spotlight projects the cookie as a clear shadow pattern on any surface.

(2) The ellipsoidal spotlight is generally used for specific, precise lighting tasks, rather than for standard television lighting.

c. Another type of spotlight that is sometimes used in the studio is the follow spotlight. This type of lighting instrument is a powerful, special effects spotlight that is primarily to simulate theater or stage effects. The follow "spot" allows you to simultaneously pan (move the light left or right) and tilt (move the light up and down). The follow spot is used to follow action, such as dancers on a stage or single performers moving about in front of a stage curtain.

3. Floodlights are designed to produce a great amount of diffused light. They are primarily used to slow down the rate of falloff, reduce shadow density, and to provide base light.

a. The most common and popular type of floodlight used is known as the scoop because of its shape (fig 1-9). It is a very versatile lighting instrument that can hold colored gels, which are used to change the color of the light, or scrims, which are used to further diffuse the light and reduce its intensity.

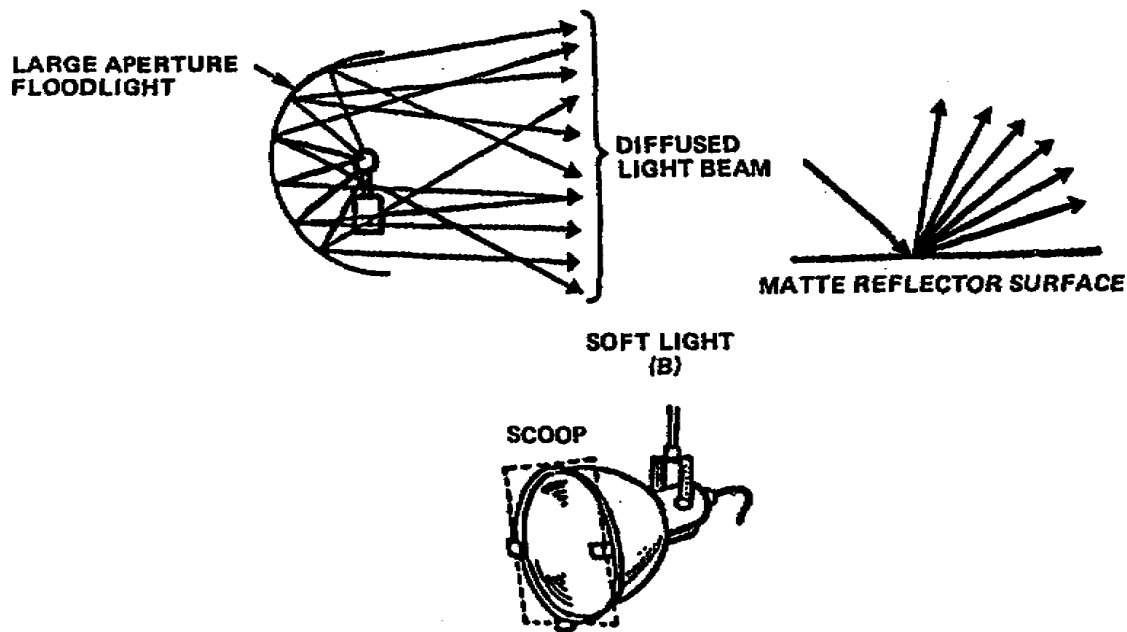


Figure 1-9. The scoop diffused light beam

b. Another type of floodlight, which acts as a series of scoops, is known as the broad. Broads illuminate a rather large area evenly with diffused light. When using broads for fill light, it is usually possible to adjust the beam of light either through the use of barn doors or with an adjustable beam, something like the fresnel spot.

c. The last type of studio floodlight we will discuss is the strip, or "cyc" light. This type of lighting instrument is used to achieve even illumination of large set areas. The strip light consists of rows of three to twelve incandescent or quartz lamps mounted in long, boxlike reflectors. Strip lights are often used for silhouette lighting, when the background must be evenly illuminated while foreground set pieces remain unlit.

4. Even though many lighting instruments have directional controls for the light beam, it is often necessary to control the direction of the beam beyond these controls. Because of this, several other devices are used to assist you. The first of these devices that we will discuss are known as the barn doors.

a. Barn doors (fig 1-10) are extremely effective when it is necessary to block certain set areas, either partially or totally, from illumination. For example, if it is necessary to keep the upper part of some scenery dark, while illuminating the lower part of that same scenery, you could simply "barn door" the upper half of the beam. Barn doors are also important for blocking the back light from shining into the camera lens, causing lens flare.

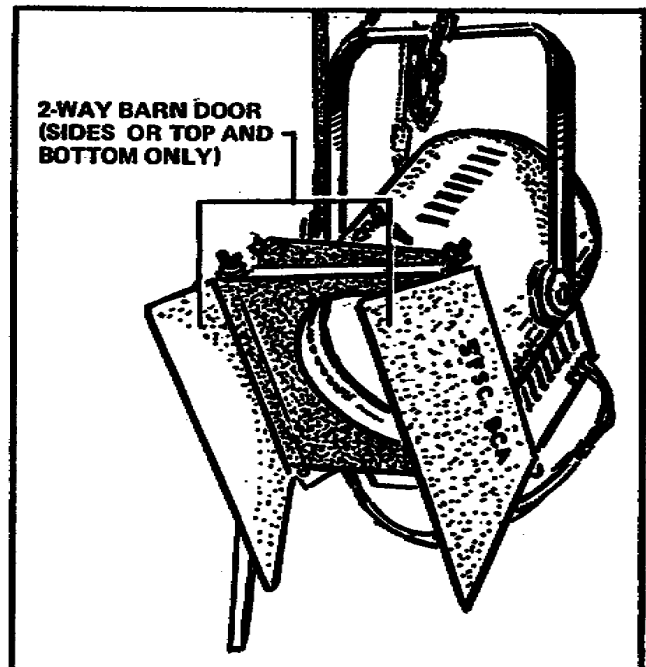
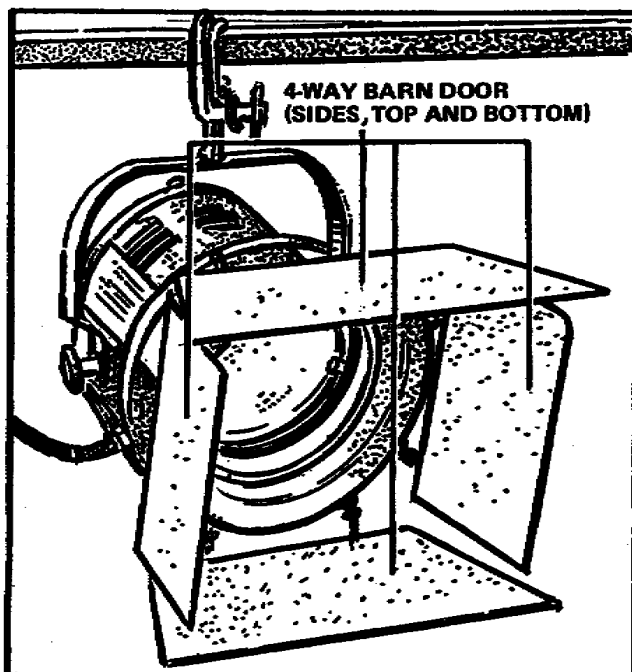


Figure 1-10. Barn doors

b. Another type of directional control device is known as a flag. Flags are rectangular metal frames with heat-resistant cloth that act much the same as barn doors except flags are not mounted directly to the lighting instrument. Flags, like barn doors, will block illumination from spilling onto unwanted areas.

c. Yet another type of directional control device is the reflector (fig 1-11). Reflectors are usually highly reflecting sheets that bounce back a strong light source onto an object or scene to slow down falloff (make shadows more translucent). Sometimes all that is needed to reflect a light source is a white cardboard sheet. Another way of making a reflector is to crumble up some aluminum foil (creating a more diffusal reflection) and tape it onto a piece of cardboard.

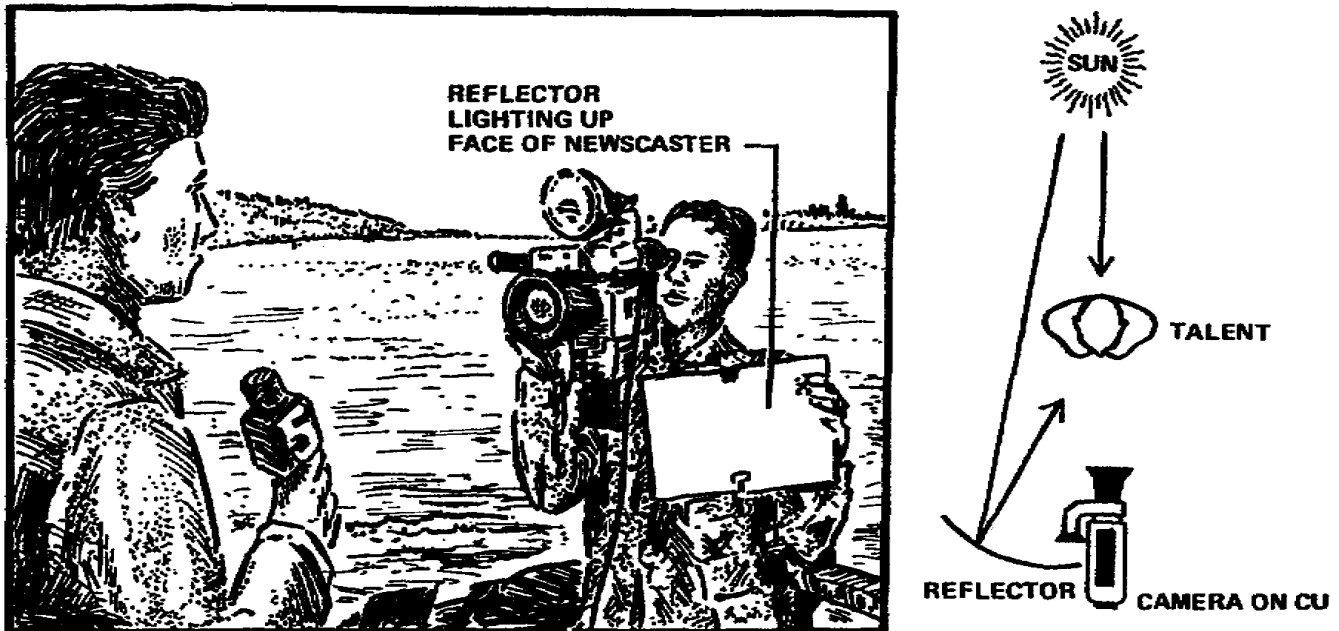


Figure 1-11. Reflector

d. The final type of directional controls we will discuss is known as the scrim (fig 1-12). Scrims are spun glass diffusers that are placed in front of floodlights or external reflector spotlights to achieve maximum diffusion of the light beam. In the studio, scrims are frequently used to produce "soft" light, especially if you need to light a large area evenly, or if you want to raise the overall base light level.

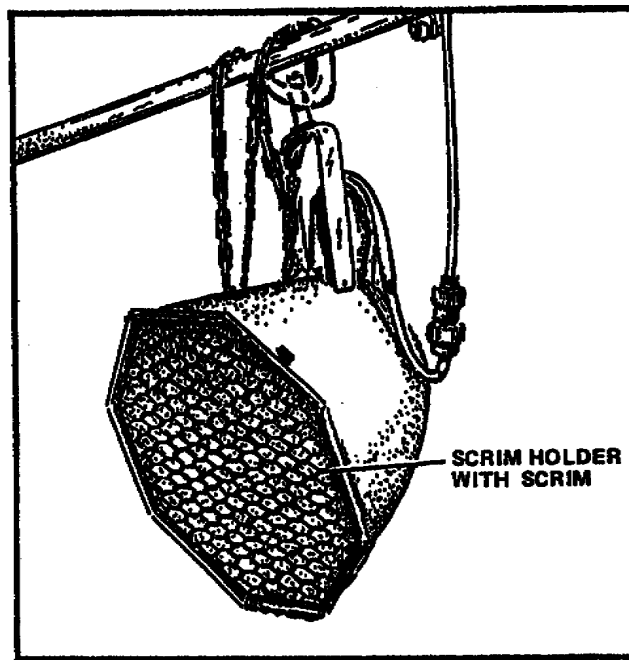


Figure 1-12. Scrim

5. Now that we have discussed the equipment used to control the direction of a beam, let us take a look at how we can control the intensity or brightness of lighting. The simplest way to control the intensity of lighting is to use only the minimum number of lighting instruments needed to light the set area. However, minimizing the lighting instruments is not always enough.

a. Another technique used to control light intensity is to use scrims, not only as light diffusers, but also to reduce light intensity. There are also thin wire mesh screens that are put in front of lighting instruments, much the same as scrims, to reduce the light output (intensity) without influencing the color temperature of the light.

b. The dimmer is the most flexible of the different light intensity control devices as it allows easy manipulation of each lighting instrument, or a group of lighting instruments, to burn at a given intensity from zero (off position) to full strength.

(1) Although dimmers are technically quite complex, their basic operational principle is quite simple; by allowing more or less current to flow to the lamp, the lamp burns as a higher or lower intensity.

(2) It can be argued that dimmers are not always useful for reducing light intensity. If the current to a lamp is reduced by more than 10 percent, the color temperature of the illumination emitted from that lamp is changed along with the light intensity. You will remember, that as the color temperature of a light source is reduced, the illumination from that light source begins to emit a reddish tint. Therefore, color temperature must be considered when using the dimmer to reduce light intensity.

(3) Dimmers, however, are used as more than simple light intensity reducers and are a very important part of lighting in the television studio. Dimmers enable you to change quickly from one type of lighting to another, or to light several areas in the studio at once and activate parts or all of this lighting whenever necessary. This eliminates, or greatly reduces, setup time between different lighting situations as all are set up and checked out prior to "show time."

(4) The patch panel, or patch bay, is a device that connects lighting instruments to the dimmer control. It allows you to connect widely scattered lighting instruments to a specific dimmer, or separate dimmers, on the dimmer control board. The patch panel, like the dimmer, is very simple to operate as all the patches are numbered to coincide with the area of the lighting grid that they activate. If a few minutes are taken by the beginning lighting technician to familiarize himself with the lighting grid and patch panel, they will be able to patch a light or a group of lights with little or no assistance.

Lesson 1
PRACTICE EXERCISE

1. Which is the best definition of lighting?
 - a. Use of a key light, back light, and fill light
 - b. Combination of overall baselight level, plus key light and back light
 - c. The contrast between light and shadow
 - d. Meeting the technical requirements of the camera while creating a pleasing picture
2. Which of the following types of light will you use to light a set?
 - a. Aesthetic and standard
 - b. Directional and diffused
 - c. Illumination and shadow
 - d. Back light and key light
3. Which of the following are two types of illumination you will be working with?
 - a. Ellipsoidal and spot
 - b. Indoor and outdoor
 - c. 3200°K and 6400°K
 - d. Incident and reflected
4. Which of the following will you use as a standard for "white" light, indoors?
 - a. 3200°K
 - b. 5500°K
 - c. 3400°K
 - d. 5280°K
5. You wish to illuminate a relatively small area with a distinct beam. Which type of light will you choose?
 - a. Directional light
 - b. Fill light
 - c. Base light
 - d. Bidirectional
6. Which of the following best defines base light?
 - a. Light source which emphasizes the outline of the object
 - b. Soft, diffused light
 - c. Widely scattered lighting controlled by the dimmer board
 - d. Overall light level on a set or event area

7. Which of the following standards will you use for outdoor color temperature?
- a. 3200°K
 - b. 3400°K
 - c. 5200°K
 - d. 5600°K
8. Which best explains contrast ratio?
- a. Outdoor lighting color temperature as compared to indoor color temperature
 - b. Difference between the lightest and darkest parts of a picture
 - c. Base light ratio versus key light ratio
 - d. Difference as defined in foot candles
9. You have selected a key light and a back light for your three-point lighting. Which other light source will you use?
- a. Directional light
 - b. Fresnel light
 - c. Side light
 - d. Fill light
10. When setting up three-point lighting, what is your primary source of illumination?
- a. Fresnel light
 - b. Hard light
 - c. Directional light
 - d. Key light
11. Which of the following light sources will you utilize to separate an object from its background?
- a. Backlight
 - b. Fill light
 - c. Side light
 - d. Key light
12. Which of the following will you use as a guide for a four-point lighting ratio?
- a. 4:1
 - b. 3:1
 - c. 2:1
 - d. 1:1

13. Which spotlight will you most likely use in television studio lighting?
- a. Fresnel
 - b. Scoop
 - c. Dimmer
 - d. Ellipsoidal
14. Which floodlight is the most popular type used in the studio?
- a. Fresnel
 - b. Dimmer
 - c. Ellipsoidal
 - d. Scoop
15. Which device would you use to block certain areas, partially or totally, from unwanted illumination?
- a. Barn doors and scrims
 - b. Barn doors and flags
 - c. Battens and barn doors
 - d. Dimmers and barn doors
16. Which device will you use to bounce the illumination from a strong light source back onto an object or scene to slow down falloff?
- a. Barn door
 - b. Batten
 - c. Reflector
 - d. Scrim
17. Which of the following devices will you use to diffuse reduce light intensity?
- a. Scrim
 - b. Dimmer
 - c. Reflector
 - d. Batten
18. What is a major drawback when using a dimmer?
- a. Safety
 - b. Hard to handle
 - c. Intensity
 - d. Color temperature may be affected

19. By which percentage can you reduce the current to a lamp without affecting its color temperature?
- a. 2 percent
 - b. 5 percent
 - c. 10 percent
 - d. 20 percent
20. Which device will you use to connect widely scattered lighting instruments to a specific dimmer or separate dimmer?
- a. Patch-to-dimmer control
 - b. Dimmer control board
 - c. Patch bay
 - d. Patch control

LESSON 2
DESCRIBE MEASUREMENT OF STUDIO LIGHT WITH A LIGHT METER

TASK

Describe light meters, their functions, and techniques of using light meters.

CONDITIONS

Given information and illustrations relating to light meters, their function and the technique of using a light meter.

STANDARDS

Demonstrate competency of the task skills and knowledge by correctly responding to 70 percent of the multiple-choice test covering descriptions of light meters, their function, and techniques of using light meters.

REFERENCES

None

Learning Event 1:

DESCRIBE LIGHT METERS, THEIR FUNCTIONS, AND THE TECHNIQUES OF USING A LIGHT METER

1. In the television studio, it is necessary that we control how much light is sent to the television camera. There are various ways of controlling the light but only one accurate way of measuring its brightness. That is with a light meter (also referred to as an exposure meter).
2. The light or exposure meter measures light intensity or brightness. Light entering the meter falls upon a light-sensitive surface, usually made of selenium, which reacts to light generating a small electric current (fig 2-1).
3. The meter is actually a microammeter which measures the current produced. The microammeter causes a needle to deflect across the face of the meter scale. The brighter the light, the more current is produced, causing greater deflection of the needle. The scale that the needle deflects across is often marked in footcandles and f/stops. For television studio lighting, the footcandle scale is the most often used.
4. When using a light meter, it stands to reason that we are measuring the amount of light on a set or event area. In actuality, we may be measuring the amount of light falling on the set or the amount of light reflecting off of the set. These two methods are called incident and reflected light measurements.

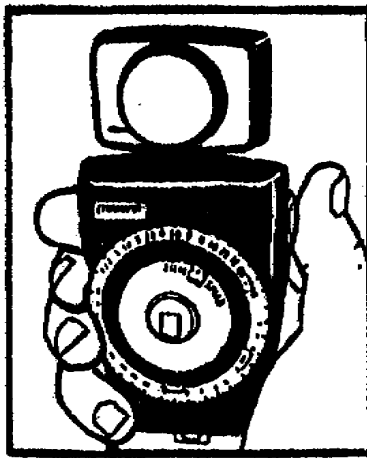


Figure 2-1. The light meter

5. Incident light measurement is measuring the amount of light falling on the set area. Incident light readings are normally taken from the position of the subject or set area being lighted (fig 2-2).

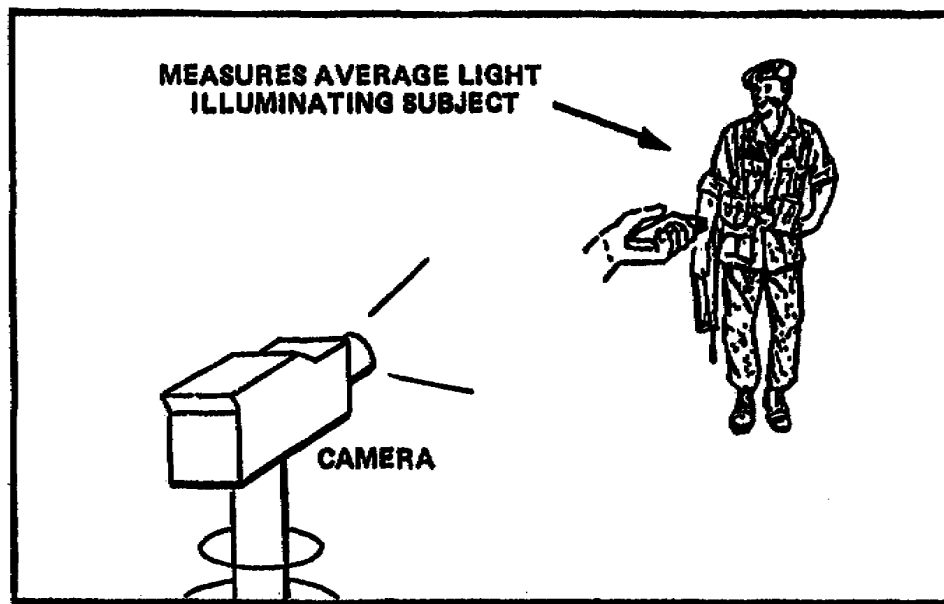


Figure 2-2. Incident light reading

6. Reflected light readings measure the amount of light reflecting or bouncing off of the subject or set area and are often used to measure the contrast ratio of a scene. These readings, if taken from the camera position as shown in Figure 2-3, measure the average light reflecting back to the camera.

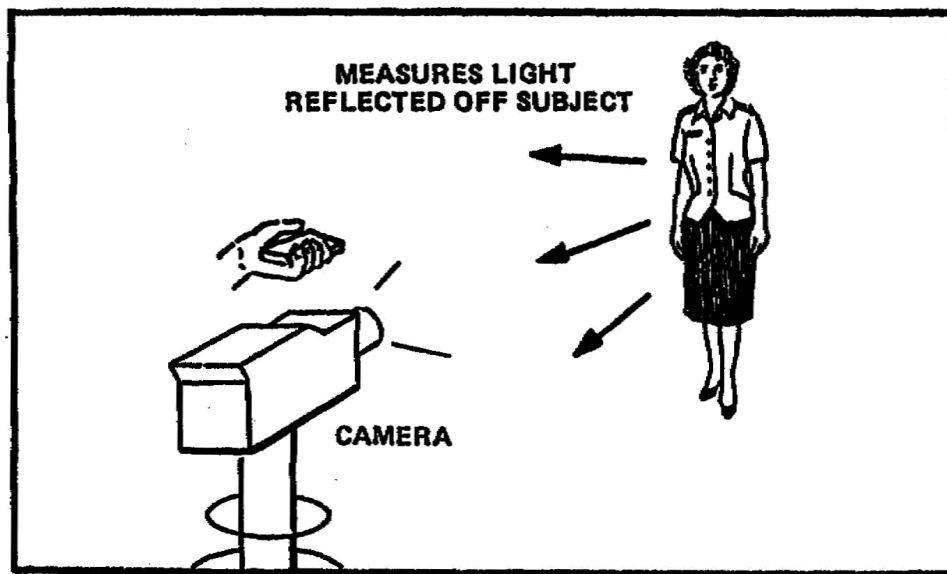


Figure 2-3. Reflected light reading

7. If reflected light readings are taken from specific parts of a scene (fig 2-3), they are used to measure surface brightness and tonal values, allowing accurate measurement of contrast ratios. This type of reflected light measurement is called the surface brightness method.

8. Refer to Table 2-1 for explanations of various methods used in measuring light, with the advantages and disadvantages listed for each method.

METHOD OF LIGHT MEASUREMENT		
INCIDENT LIGHT METHOD	REFLECTED LIGHT METHOD	SURFACE BRIGHTNESS METHOD
METER POSITIONED BESIDE THE SUBJECT POINTING AT LIGHT SOURCES.	METER POSITIONED BESIDE THE CAMERA, POINTING AT SUBJECT.	METER POSITIONED BESIDE THE CAMERA POINTING AT THE SUBJECT.
MEASURES LIGHT INTENSITY FALLING UPON SUBJECT FROM EACH LAMP DIRECTION IN TURN.	MEASURES AVERAGE AMOUNT OF LIGHT REFLECTED FROM SCENE AND RECEIVED AT CAMERA LENS.	MEASURES BRIGHTNESS OF SURFACE AT WHICH THE INSTRUMENT IS DIRECTED.
PROVIDING FOR (AVERAGE) SUBJECTS OF FAIRLY RESTRICTED TONAL RANGE TYPICAL INCIDENT LIGHT INTENSITIES AND BALANCE SUITABLE TO CAMERA CAN BE ASSESSED. BASE LIGHT, KEY LIGHT, FILL LIGHT, AND BACK LIGHT MEASURED IN TURN.	PROVIDING AVERAGE REFLECTED LIGHT LEVELS SUITABLE TO CAMERAS SENSITIVITY. MEASURE LIGHTEST AND (DARKEST TONES SEPARATELY AND USE MIDWAY READING FOR GUIDE EXPOSURE.)	PROVIDES READINGS BY MEASURING SURFACES KNOWN REFLECTANCE SKIN, (STANDARD WHITE AND BLACK). YOU CAN THEN DEDUCE THE SUITABILITY OF LIGHT INTENSITIES FALLING UPON THEM. ALSO ALLOWS SCENIC TONAL CONTRASTS TO BE MEASURED TO PREVENT OVER-CONTRASTY LIGHTING OVER LIT HIGH-LIGHTS UNDER LIT SHADOWS.
EASE OF OPERATION: METHOD IS SIMPLE AND CON CONSISTENT. DOES NOT REQUIRE EXPERIENCED INTERPOLATION WIDELY USED IN MOTION PICTURE LIGHTING.	EASE OF OPERATION: READINGS VARY WITH METER ANGLING AND EXPERIENCE IS NEEDED TO MAKE ALLOWANCE FOR SUBJECT TONES, AND CONTRAST. LARGE DARK AREAS CAUSE READINGS TO BE FALSELY LOW, ENCOURAGING OVEREXPOSURE OF HIGHLIGHTS. LARGE LIGHT AREAS GIVE HIGH READINGS WHICH MAY CAUSE UNDEREXPOSED SHADOWS	EASE OF OPERATION: METHOD REQUIRES SOME EXPERIENCE IN JUDGING THE IMPORTANCE OF INDIVIDUAL SURFACES BRIGHTNESS RELATIVE TO OVERALL EXPOSURE.
ADVANTAGES: WHEN A SHOW IS TO BE REPEATED ORIGINAL LEVELS CAN BE DUPLICATED READILY. BALANCE BETWEEN VARIOUS LIGHT DIRECTIONS READILY CHECKED.	ADVANTAGES: METHOD PROVIDES A QUICK ROUGH CHECK OF AVERAGE LIGHT LEVELS CAN FACILITATE EVENNESS OF LIGHTING.	ADVANTAGES: METHOD IS CAPABLE OF ASSESSING SURFACE BRIGHTNESS AND CONTRAST VERY ACCURATELY.
DISADVANTAGES: ARBITRARY ALLOWANCE HAS TO BE MADE FOR SUBJECT TONES. THE AMOUNT OF LIGHT REQUIRED DEPENDS UPON THE SUBJECT--WHICH THIS METHOD CANNOT ASSESS. METHOD ONLY DIRECTLY USEFULL FOR AVERAGE SUBJECT-TONES. DOES NOT TAKE INTO ACCOUNT TONAL VALUES PROPORTION OF TONES AND TONAL CONTRAST.	DISADVANTAGES: METER READINGS ARE ONLY OF AN AVERAGE NATURE WHICH VARIES CONSIDERABLY WITH TONAL VALUES AND PROPORTIONS. METHOD DOES NOT INDICATE CONTRAST RANGE OF SUBJECT OR LIGHTING. METER'S ANGLE-OF-VIEW SELDOM IDENTICAL WITH THE CAMERA-LENS WHERE 3 SINGLE SURFACE (E.G.A FACE) IS TO BE EQUALLY EXPOSED IN A VARIETY OF SETTINGS MEASURED EXPOSURE SHOULD BE CONSTANT BUT WILL VARY AS ADJACENT TONES CHANGE.	ADVANTAGES: SEVERAL SEPARATE READINGS ARE NECESSARY TO CHECK EVENNESS OF LIGHTING AND CONTRAST. METHOD MEASURES SCENIC TONES, BUT DOES NOT DISTINGUISH THEIR RELATIVE IMPORTANCE: AND HENCE THE DESIRED EXPOSURE. TONAL CONTRAST MEASUREMENTS MAY NOT SIGNIFY: IF THE TONES MEASURED DO NOT APPEAR TOGETHER IN PICTURE. IF THEIR PROPORTIONS ARE SMALL AND UNIMPORTANT. IF THEY MAY BE ACCEPTABLY CRUSHED OUT WITHOUT INJURING PICTORIAL QUALITY.
NOTE: WHERE METER IS HELD CLOSE TO SUBJECT, MEASURING INDIVIDUAL SURFACE BRIGHTNESS, METHOD BECOMES AS FOR SURFACE BRIGHTNESS METHOD.		

Table 2-1. Methods of light measurement

Learning Event 2:

DESCRIBE THE TECHNIQUE OF USING LIGHT METERS

1. As discussed in Lesson 1, it is necessary for us to measure both lighting ratios and contrast ratios.
2. Lighting ratios are realized by measuring the difference in light intensity being emitted by different lighting instruments. Lighting ratios are measured by using incident light readings. For example: to measure the lighting ratio between the key light and the fill light, when setting up three-point lighting, turn on just the key light and measure its light intensity. Then turn off the key light and turn on just the fill light. Now measure the fill light's intensity. If the key light intensity is 100 footcandles and the fill light's intensity is 50 footcandles, then the lighting

ratio between key light and fill light is 100:50 or more simply 2:1. This same procedure could be used to measure the lighting ratio for all lighting instruments in the studio.

3. Contrast ratios, on the other hand, are measured quite differently. When measuring contrast ratios, the important factor is the amount of light reflecting off the screen, rather than the amount of light falling on it. The surface brightness method of light measurement is used to measure contrast ratios. To measure contrast ratio, it is necessary to measure the scene in the different brightness areas (fig 2-3). If the lightest area of the scene reflects 200 footcandles and the darkest area of the scene reflects 20 footcandles, we have a contrast ratio of 200:20 or 10:1, well within the 30:1 contrast limits of today's color television cameras.

4. There are many different makes and models of light meters with varied options and functions. When working with your light meter for the first time, read the operating instructions and familiarize yourself with the light meter prior to taking important light readings.

5. Once familiar with your light meter, a little practice using the different methods of light measurement should enable you to measure the light levels on your set precisely and accurately.

6. The beginning lighting technician often becomes a slave to lighting measurements and ratios. Usually, a quick check of baselight levels is all that is needed for most lighting situations. In especially critical situations, it may be necessary to check reflectance of faces or bright objects. Some lighting technicians get so involved in reading the light meter that they forget to look into the monitor to see if the lighting looks the way it was intended. If you, as the lighting technician, use your knowledge of how the camera works and combine that knowledge with artistic sensitivity and especially common sense, you will not have the light meter tell you how to light; rather, you will use it as a guide to make your job more efficient.

Lesson 2
PRACTICE EXERCISE

1. You are measuring light intensity. Which of the following would you choose for accuracy?
 - a. Metric light gauge
 - b. The trained eye
 - c. Selenium calibrator
 - d. Light meter
2. Which two methods will you employ to measure light intensity?
 - a. Technical and aesthetic
 - b. Incident and reflected
 - c. Concentrated and diffused
 - d. Minimum and maximum
3. Which method of light measurement would you use to measure light falling on the set?
 - a. Aesthetic
 - b. Baselight
 - c. Incident
 - d. Technical
4. How do you measure contrast ratio?
 - a. On a waveform monitor
 - b. Using an f/stop
 - c. By measuring ASA
 - d. By measuring surface brightness
5. You are measuring light intensity emitted by different light instruments. Which ratio will you use?
 - a. Brightness ratio
 - b. Lighting ratio
 - c. Contrast ratio
 - d. Reflectance ratio
6. You are measuring the different brightness areas of your scene. Which ratio are you measuring?
 - a. Brightness ratio
 - b. Intensity ratio
 - c. Contrast ratio
 - d. Reflectance ratio

7. Which of the following is a standard contrast ratio for a color television?
- a. 60:1
 - b. 50:1
 - c. 40:1
 - d. 30:1
8. Which method of light reading would you use to measure the amount of light emitted from the object to the camera?
- a. Diffused
 - b. Optical
 - c. Reflected
 - d. Principal
9. Which method of light measurement would you use to measure the difference in light intensity between the key light and the fill light?
- a. Principal
 - b. Incident
 - c. Optical
 - d. Incandescent
10. The brightest area of your set reflects 200 footcandles whereas the darkest area reflects 20 footcandles. How would you best describe your contrast ratio?
- a. 20:20
 - b. 30:1
 - c. 20:1
 - d. 10:1

LESSON 3
DEFINE BASIC LIGHTING TECHNIQUES IN THE FIELD

TASK

Define lighting techniques in the field, describe the equipment used, and the differences between field and studio lighting.

CONDITIONS

Given information and illustrations relating to field lighting techniques.

STANDARDS

Demonstrate competency of the task skills and knowledge by correctly responding to 70 percent of the multiple-choice test covering field lighting techniques of a television production.

REFERENCES

None

Learning Event 1:

DEFINE LIGHTING TECHNIQUES IN THE FIELD AND DESCRIBE THE EQUIPMENT USED

1. When engaged in field or "remote" productions, you will not be working in the studio where all lighting equipment is in place and ready to go. Every piece of equipment; however large or small, must be hauled to the remote location and set up in places that always seem too small or too large for good television lighting. Also, there never seems to be enough time to experiment with various lighting setups in order to find the most effective one. Because of these factors, a lot of planning is necessary to complete a remote lighting task with the minimum amount of time and equipment.

a. Remote productions can vary from a simple interview in someone's office to highly complex scenes shot "on location." Regardless of how simple or complex the remote production is, you will soon find out that time is at a premium. Therefore, you must plan your lighting task within time and equipment constraints, be prepared to compromise, and strive for the best lighting possible, relative to the other production requirements.

b. When lighting for remote productions, you will find yourself confronted with both indoor and outdoor lighting requirements. Frequently, you will be using available light; that is, the illumination already present at the remote site. But there are many occasions when you must supplement the available light or provide the entire lighting for the production.

2. When shooting outdoors, the primary source of illumination is the sun. Even though we have no direct control over the sun, there are ways to make it work to our advantage. The sun's illumination can also be supplemented by using special lighting instruments and accessories.

3. The ideal light for shooting outdoors is an overcast day. The clouds act as diffusers for the hard, directional sunlight, providing an even illumination. Because the diffused light of an overcast day creates rather soft shadows and therefore slow falloff, shadows are not usually a problem. However, try not to position a person in front of a white or otherwise bright background. The auto-iris of the camera will read and adjust to the bright background rather than the person. Consequently, the person will be underexposed and appear as a silhouette in front of the properly exposed background.

4. Most outdoor lighting problems occur on bright, sunny days. During this type of day, the sunlight is highly directional and produces dense shadows (fast falloff). Here are some helpful hints of how to "shoot" in bright sunlight.

a. Whenever possible, shoot with the sun, not into it. That is, the sun should be in the camera operator's rear. If you shoot against the sun (backlit), the auto-iris in the camera lens will expose about two stops under the proper exposure causing the subject to be underexposed. If you must shoot your subject backlit, try to get as close a shot as possible and use a reflector to bounce as much light on your subject as possible (fig 3-1).

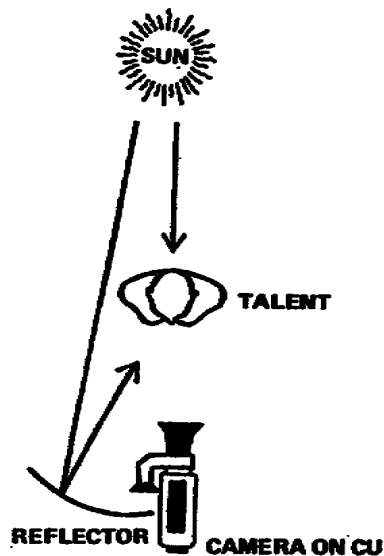


Figure 3-1. Shooting backlit

b. In bright sunlight, the problem of bright backgrounds is more severe than in the diffused light of an overcast day. Again, try to avoid shooting against a bright, sunlit background. Even if the camera is on manual iris control and is adjusted for this foreground figure, the bright background will

often push the contrast ratio beyond the 30:1 limit. This extreme contrast would cause background overexposure. If you cannot avoid the bright background, you may have to shoot the scene anyway. If this is the case, be sure your subject is exposed properly, by using the manual iris control on the camera, and allow the background to overexpose.

c. The dense shadows (fast falloff) on bright days can be lessened (slow down the rate of falloff) somewhat by using a reflector. The reflector bounces back some of the sunlight and renders the dense shadows more translucent (fig 3-2).

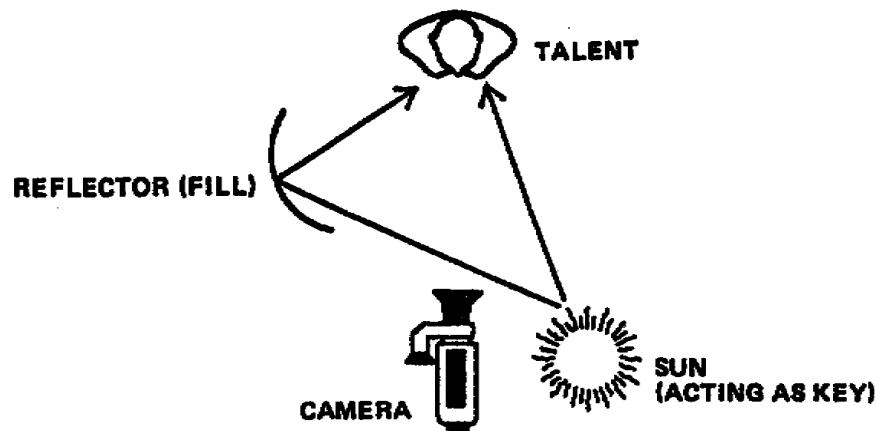


Figure 3-2. Use of reflector to lighten shadows

5. When shooting in inadequate outdoor illumination, try to keep the camera as steady as possible in order to minimize lag and comet-tailing. It is also important to note that when you are shooting under low light conditions, the camera iris must be opened much wider than when shooting under adequate lighting. This will shrink the depth of field, making the focus much more critical than when shooting in bright sunlight. This is because the amount the iris is open directly affects depth of field. When the iris on the camera is set to a wide opening, the depth of field is shallow, meaning that some parts of the scene will be in focus while others will not. In good lighting conditions, the iris will be set to a smaller opening, which increases the depth of field. If this knowledge is combined with the fact that the focal length of the camera lens also affects depth of field, (the longer the lens focal length the more shallow the depth of field will be); you should be able to shoot under low light conditions and still keep the important parts of the scene in acceptable focus.

Learning Event 2:

DESCRIBE THE DIFFERENCE BETWEEN FIELD AND STUDIO LIGHTING TECHNIQUES

1. Shooting outdoors may require the use of lighting instruments in addition to reflector. However, you will recall that most lighting instruments illuminate a color temperature of 3200 degrees kelvin. But outdoor illumination has

a color temperature of 5600 degrees kelvin. Television cameras can be adjusted to operate under either of these color temperatures but not both at the same time. Therefore, when using lighting instruments outdoors to supplement available sunlight, the color temperature of the available light and the lighting instruments used to supplement that light must be matched. Since we can't change the color temperature of the sun, we must match the color temperature of the lighting instruments to the sun.

a. The easiest method of changing a lighting instrument's color temperature is by attaching a dichroic daylight filter to the front of the lighting instrument. A daylight dichroic filter will change the color temperature of the illumination emitted by the lighting instrument to 5600 degrees kelvin, matching the color temperature of outdoor illumination. A blue gel can be used as a substitute for a dichroic daylight filter, but care must be taken to ensure that the gel does not change the illumination beyond 5600K. Otherwise, the scene will take on a bluish tint.

b. When shooting indoors, matching color temperatures of different light sources can be even more difficult than when shooting outdoors. Some interiors are illuminated by the daylight that comes through large windows, others with fluorescent lighting, and still others use desk and floor lamps to augment the daylight that is coming through windows. The major problem here is not so much how to supply additional light but how to match the various color temperatures.

2. The most difficult problem is having to shoot your subject with a large window in the background. Often a general wants to make his or her brief statement from behind a desk, and the desk may be located in front of a large viewing window. There are two lighting problems in this situation. First of all, there is a problem identical to that of a person in front of a bright background. If you set the iris according to the background brightness, the general in front tends to turn into a silhouette. If you adjust the iris to the general, the background is overexposed. Secondly, the color of the light coming through the window does not match the illumination used to light the room. If you adjust the camera to the daylight color temperature, the illumination will appear bluish. Let us take a look at some possible solutions to these problems.

a. The best method of controlling both of these problems is to draw the curtains or blinds and light the set using portable lighting instruments. Unfortunately, not all office windows have curtains or blinds. Another easy method of controlling these problems is to "shoot" your subject using only closeups, thus eliminating most of the background. The "closeup only" method is not always practical either. For instance, some people just do not look good when shown close up.

b. If you must shoot the scene with the window in the background, it is possible to cover the windows with large plastic neutral density and color correction filter sheets. Neutral density (ND) filters act like sun glasses, reducing the intensity of the light without changing color temperature. Color correction filters, on the other hand, change the color temperature of the light. A combination neutral density and color correction filter sheet can be

used to change light intensity and color temperature. Even though they are very effective, these filter sheets are not used very often primarily because of the cost associated with them, or the time that is required to put them in place.

c. Another possible method of handling this situation is to shoot your subject with the window to his side, rather than to his rear and use a reflector or a portable lighting instrument with a daylight dichroic filter attached to it as an additional light source (fig 3-3). By using this method, the daylight coming through the window is used as the key light and the additional light source or reflector is the fill light. As you can see, this allows the daylight coming through the window to be used as part of the set lighting, rather than a hindrance to it.

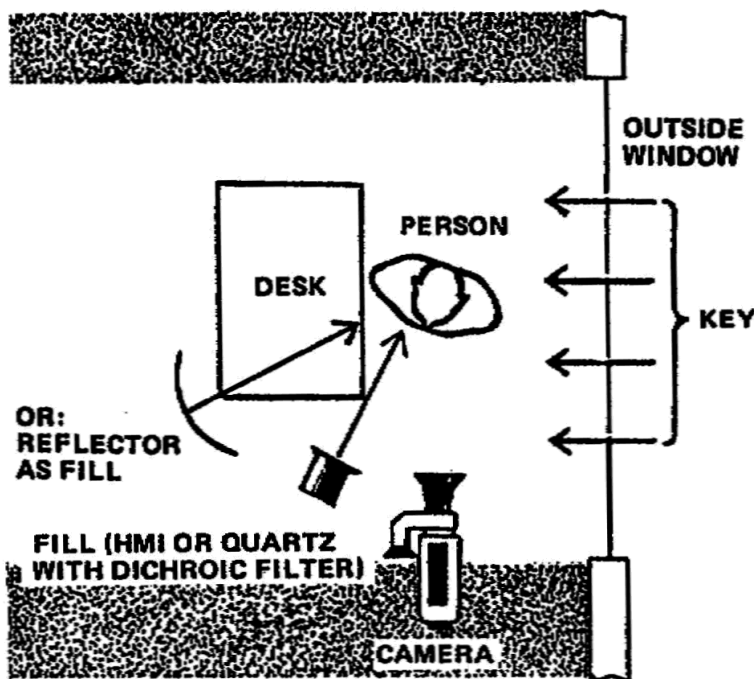


Figure 3-3. Using daylight from a window as the key light

3. The problem of working under fluorescent lights is their color temperature. It is always higher than the standard of incandescent lights (3200K). So, if you use additional lighting instruments, you are once again confronted with two color temperatures. Some lighting people advise turning the fluorescent lights off altogether when using quartz lights (3200K), but this is not always practical. If you are shooting a fast-breaking story, you just won't have time, first, to locate the building manager and persuade him to turn off the lights, then relight the scene before you start shooting.

a. If you have to use a quartz light for additional illumination, either boost the color temperature of the quartz light (using a dichroic filter) or adjust the camera using the illumination provided by the quartz light (3200K). Generally, a quartz light, such as a sun gun, is strong enough to "wash out" the bluish tint emitted by the fluorescent base light. Even if you could turn off the fluorescent lights, you might want to leave them on to

have enough base light. A higher base light allows you to work with smaller lens iris openings which increases depth of field, making it easier to focus.

b. When lighting large groups of people, such as commanders' calls or chaplains' briefings, the easiest and most efficient method to light is by establishing a general, nondirectional base light. Simply use two or three portable lights and bounce the illumination emitted by them off the ceiling or walls. If this is not possible, direct the light on the group but diffuse the light with scrims. The most efficient method is to use two or three small, high intensity lights, such as tota-lights and diffuse their beam with umbrellas (fig 3-4).

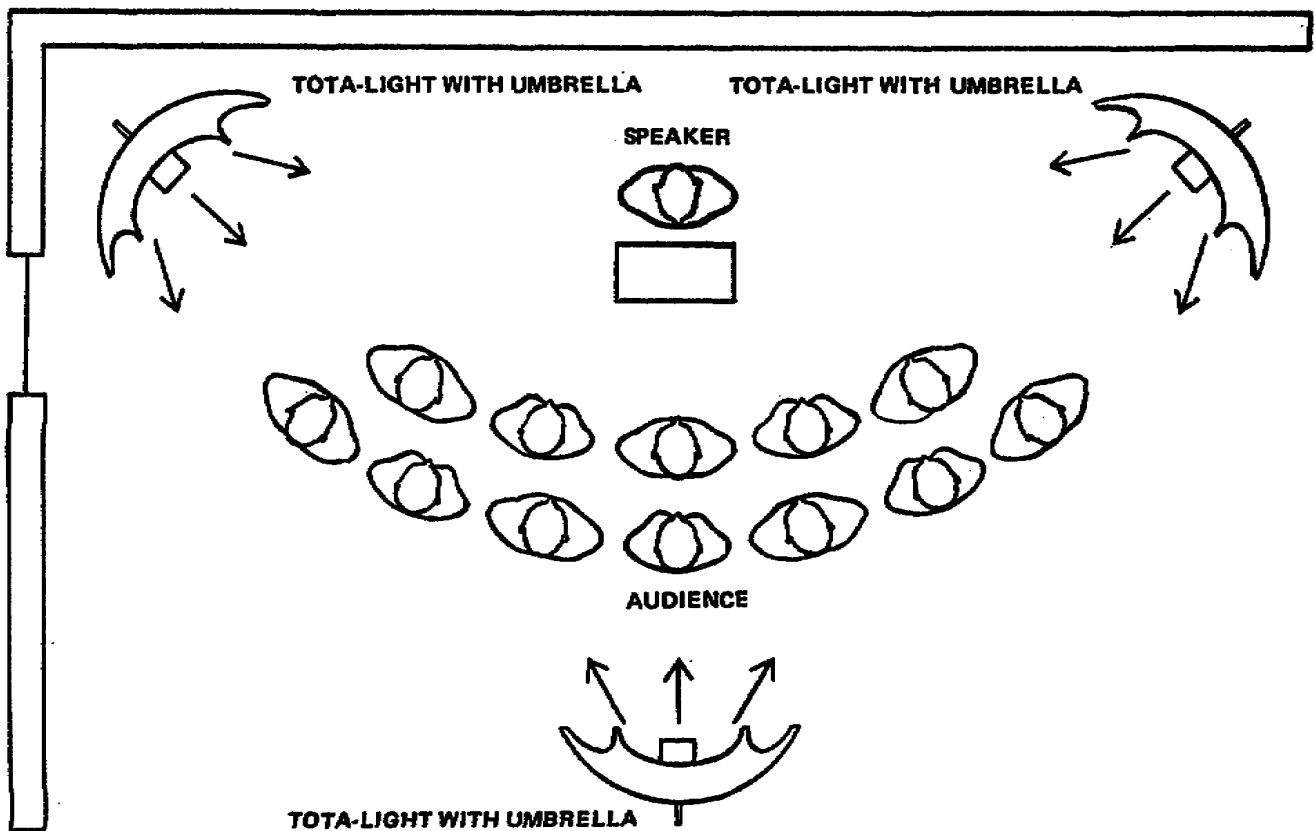


Figure 3-4. Lighting a large group

4. When time and equipment are available, the same basic lighting principles are used in field lighting as are used in the studio. If you refer to Figure 3-5, you see three-point lighting set up the same way it would be set up in the studio. In this situation, however, the portable lights are of a type that can be placed in either the spot or flood position. This lighting also shows the use of a background light.

a. It is worth noting that the background light is positioned on the same side of the subject as the key light. This is because the lighting should appear to be coming from the same direction, as if the scene were being illuminated by the sun. You will remember that in three-point lighting, the key light is the primary light source; therefore, in order to maintain directional continuity in our lighting, it stands to reason that any background lighting should come from the same direction as the key light.

b. Figure 3-5 also shows an alternative to using three lights to accomplish three-point lighting. If, because of electrical power restrictions or lack of enough lighting instruments, you cannot use three instruments, a reflector can be used in place of the fill light. The reflector will bounce enough light back on our subject to adequately fill in the shadow areas cast by the key light.

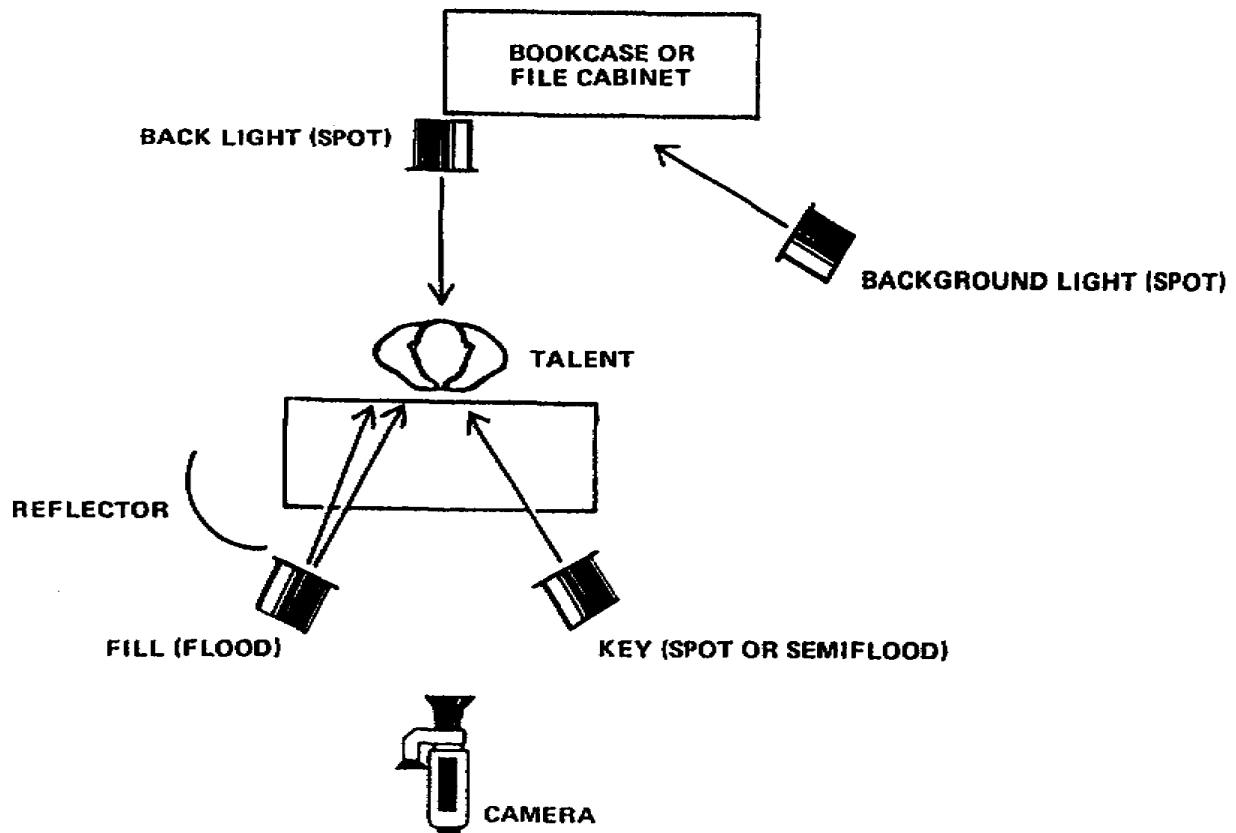


Figure 3-5. Three-point lighting in the field

5. There are many times when three- or four-point lighting is just not practical to use. A two-person interview is certainly one of those times. When lighting for this type of production, whether in the studio or on remote, it just is not practical to set up three-point lighting for each subject. Lighting this scene, using the three-point lighting setup would take six lighting instruments and a great deal of electrical power. Even if the lighting instruments and the electrical power are available, the intensity of the light from so many instruments would be extremely high causing "hot spots" on your subject.

a. A good alternative to using three-point lighting is shown in Figure 3-6. Here, the key light for the interviewer is also the backlight for the guest and the key light for the guest becomes the back light for the interviewer. This eliminates two lighting instruments while still meeting the key/back photographic principle.

b. Figure 3-6 further shows camera lights being used as the fill lights, although reflectors could be used to perform this function, further reducing the lighting instruments used.

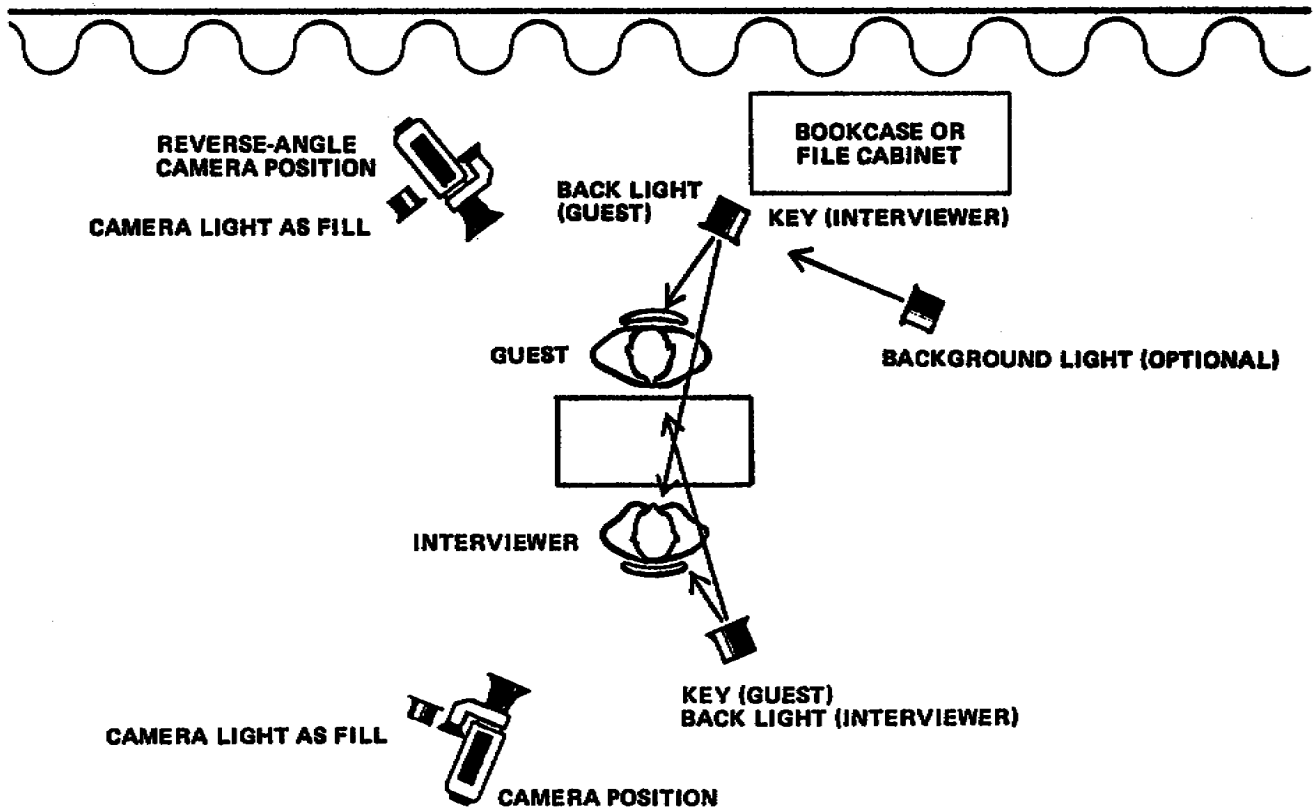


Figure 3-6. Lighting for a two-person interview

Lesson 3
PRACTICE EXERCISE

1. You are shooting outdoors, what is your primary source of illumination?
 - a. Sunbelt
 - b. Sun gun
 - c. Sun
 - d. Reflector
2. Which of the following would be the ideal situation for shooting outdoors?
 - a. An overcast day
 - b. Bright sunlight
 - c. Directional sunlight
 - d. Fast falloff
3. Your lighting situation is an overcast day with soft shadows. Which of the following best describes your falloff?
 - a. Fast falloff
 - b. Slow falloff
 - c. Medium falloff
 - d. No falloff
4. Whenever possible, what should be the position of the sun in relation to the cameraman?
 - a. Sun should be in rear
 - b. Sun should be directly overhead
 - c. Sun should be in front
 - d. Whichever the cameraman prefers
5. What will be the position of your auto-iris if you are shooting backlit?
 - a. One stop under the proper exposure
 - b. Two stops under the exposure
 - c. Three stops under the exposure
 - d. Four stops under the exposure
6. You are shooting outdoors in bright sunlight. What is the best way to lighten shadows by slowing down the rate of falloff?
 - a. Use a scoop
 - b. Use a cucalorus
 - c. Use a flag
 - d. Use a reflector

7. What is your depth of field if your camera iris is set to a wide opening?
 - a. Inverted
 - b. Long
 - c. Shallow
 - d. Great
8. Which type of filter should you attach to your lighting instrument to change your color temperature?
 - a. Neutral density
 - b. Diffusion filter
 - c. Dichroic daylight
 - d. Starburst
9. Your focal length also affects depth of field. Which of the following is a true statement?
 - a. The longer the focal length, the greater depth of field
 - b. The longer the focal length, the more shallow depth of field
 - c. The longer the focal length, the more intense the depth of field
 - d. The longer the focal length, the depth of field is inverted
10. Your subject is seated at a desk in front of a window and you adjust the camera to indoor illumination. What color will the illumination appear that is coming through the window?
 - a. Bluish
 - b. Reddish
 - c. Greenish
 - d. Brownish
11. Which filter should you use to reduce light intensity without affecting color temperature?
 - a. Diffusion
 - b. Dichroic daylight
 - c. Neutral density
 - d. Starburst
12. What is the color temperature rating of your quartz light?
 - a. 5600°K
 - b. 4800°K
 - c. 3400°K
 - d. 3200°K

13. You are positioning your background light. Where should it be positioned in relation to the key light?
- a. On the same side as the key light
 - b. Opposite from the key light
 - c. Above the subject and the key light
 - d. Below the subject and the key light
14. What is your primary light source in three-point lighting?
- a. Base light
 - b. Fill light
 - c. Key light
 - d. Back light
15. You are using three-point lighting for an on-site production. There are two lighting instruments available. What is the best alternative?
- a. Delay production
 - b. Use a reflector as a key light
 - c. Use a reflector as a fill light
 - d. Adjust for indoor illumination

ANSWERS TO PRACTICE EXERCISES

Lesson 1

1.	d	LE 1	para 3	pg	2
2.	b	LE 1	para 4	pg	2
3.	b	LE 1	para 4	pg	2
4.	a	LE 1	para 5	pg	3
5.	a	LE 1	para 4a	pg	2
6.	d	LE 1	para 6a	pg	3
7.	d	LE 1	para 5a	pg	3
8.	b	LE 1	para 6b(2)	pg	4
9.	d	LE 1	para 8b	pg	5
10.	d	LE 1	para 8c	pg	6
11.	a	LE 1	para 8e	pg	7
12.	d	LE 1	para 9b	pg	8
13.	a	LE 2	para 2a	pg	11
14.	d	LE 2	para 3a	pg	12
15.	b	LE 2	para 4	pg	13
16.	c	LE 2	para 4c	pg	14
17.	a	LE 2	para 4d	pg	14
18.	d	LE 2	para 5b(2)	pg	15
19.	c	LE 2	para 5b(2)	pg	15
20.	c	LE 2	para 5b(4)	pg	16

Lesson 2

1.	d	LE 1	para 1	pg	21
2.	b	LE 1	para 4	pg	21
3.	c	LE 1	para 5	pg	22
4.	d	LE 2	para 3	pg	25
5.	b	LE 2	para 2	pg	24
6.	c	LE 2	para 3	pg	25
7.	d	LE 2	para 3	pg	25
8.	c	LE 1	para 6	pg	24
9.	b	LE 2	para 2	pg	24
10.	d	LE 2	para 3	pg	25

(Table 2-1)

Lesson 3

1.	c	LE 1	para 2	pg 29
2.	a	LE 1	para 3	pg 29
3.	b	LE 1	para 3	pg 29
4.	a	LE 1	para 4a	pg 29
5.	b	LE 1	para 4a	pg 29
6.	d	LE 1	para 4c	pg 30
7.	c	LE 1	para 5	pg 30
8.	c	LE 2	para 1a	pg 31
9.	b	LE 1	para 5	pg 30
10.	a	LE 2	para 2	pg 31
11.	c	LE 2	para 2b	pg 31
12.	d	LE 2	para 3	pg 32
13.	a	LE 2	para 4a	pg 34
14.	c	LE 2	para 4a	pg 34
15.	c	LE 2	para 4b	pg 34