Television Production Handbook

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Zettl

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CHAPTER

1

The Television Production Process

You may think that television production is a relatively simple task. After all, you do pretty well with your camcorder. When watching a newscast from the control room at a local television station, however, you realize that television production involves much more than just operating a camcorder. Even a seemingly simple production—such as a news anchor first introducing and then playing a videotape of the school principal showing to parents and reporters the computer lab—involves a great number of intricate operations by news production personnel and the use of many sophisticated machines. A 55-second chitchat between a TV news anchor in Portland and a tennis star in London presents a formidable challenge even for highly experienced production personnel.

When watching television, viewers are largely unaware of such production complexities. But as you can see, professional television production—regardless of whether it is done in a television station or in the field—is a complex creative process in which people and machines interact to bring a variety of messages and experiences to a large audience. Even when involved in a relatively small production, you need to know what machines and people are necessary to achieve a certain type of television communication and how to coordinate the many creative and technical elements.

Chapter 1 is designed to provide you with an overview of the various equipment and production processes. Section 1.1, What Television Production Is All About, introduces the television system and its many production elements. Section 1.2, Studios, Master Control, and Support Areas, describes the environment in which the television studio system operates.

KEY TERMS

camcorder A portable camera with the videotape recorder or some other recording device attached or built into it to form a single unit.

control room A room adjacent to the studio in which the director, the technical director, the audio engineer, and sometimes the lighting director perform their various production functions.

electronic field production (EFP) Television production outside the studio that is usually shot for postproduction (not live). Usually called *field production*.

electronic news gathering (ENG) The use of portable camcorders or cameras with separate portable VTRs, lights, and sound equipment for the production of daily news stories. ENG is usually not planned in advance and is usually transmitted live or immediately after postproduction.

expanded system A television system consisting of equipment and procedures that allows for selection, control, recording, playback, and transmission of television pictures and sound.

feed Signal transmission from one program source to another, such as a network feed or a remote feed.

house number The in-house system of identification for each piece of recorded program material. Called the *house number* because the code numbers differ from station to station (house to house).

intercom Short for *intercommunication system*. Used by all production and technical personnel. The most widely used system has telephone headsets to facilitate voice communication on several wired or wireless channels. Includes other systems, such as I.F.B. and cell phones.

lighting The manipulation of light and shadows: to provide the camera with adequate illumination for technically acceptable pictures; to tell us what the objects on-screen actually look like; and to establish the general mood of the event.

line monitor The monitor that shows only the line-out pictures that go on the air or on videotape. Also called *master monitor* or *program monitor*.

line-out The line that carries the final video or audio output for broadcast.

log The major operational document: a second-by-second list of every program aired on a particular day. It carries such information as program source or origin, scheduled program time, program duration, video and audio information, code identification (house number, for example), program title, program type, and additional pertinent information.

master control Nerve center for all telecasts. Controls the program input, storage, and retrieval for on-the-air telecasts. Also oversees technical quality of all program material.

monitor (1) *Audio:* speaker that carries the program sound independent of the line-out. (2) *Video:* high-quality television set used in the television studio and control rooms. Cannot receive broadcast signals.

P.L. Stands for *private line* or *phone line*. Major intercommunication system in television production.

preview (P/V) monitor (1) Any monitor that shows a video source, except for the line (master) and off-the-air monitors. (2) A color monitor that shows the director the picture to be used for the next shot.

program speaker A loudspeaker in the control room that carries the program sound. Its volume can be controlled without affecting the actual line-out program feed. Also called *audio monitor*.

studio talkback A public address loudspeaker system from the control room to the studio. Also called *S.A.* (*studio address*) or *P.A.* (*public address*) *system*.

system The interrelationship of various elements and processes whereby the proper functioning of each element is dependent on all others.

tapeless system Refers to the recording, storage, and playback of audio and video information via computer storage devices rather than videotape.

television system Equipment and people who operate the equipment for the production of specific programs. The basic television system consists of a television camera and a microphone that convert pictures and sound into electrical signals, and a television set and a loudspeaker that convert the signals back into pictures and sound.

SECTION

1.1

What Television Production Is All About

The major problem in learning about television production is that to understand one specific production tool or technique, such as optimal lighting, you should already know the functions of the lens, the iris, maximum and minimum aperture, and depth of field. In turn, you need to know something about how colored light behaves before you can adequately understand how a camera or a color television receiver works. Because I can't cram all the necessary information into a single paragraph, and you can't learn the various production elements and operations all at once, we compromise and begin this book with a broad overview of the television production system. By viewing television production as a system, you will readily see the interconnections among the various system elements, even when they are presented piecemeal.

BASIC TELEVISION SYSTEM

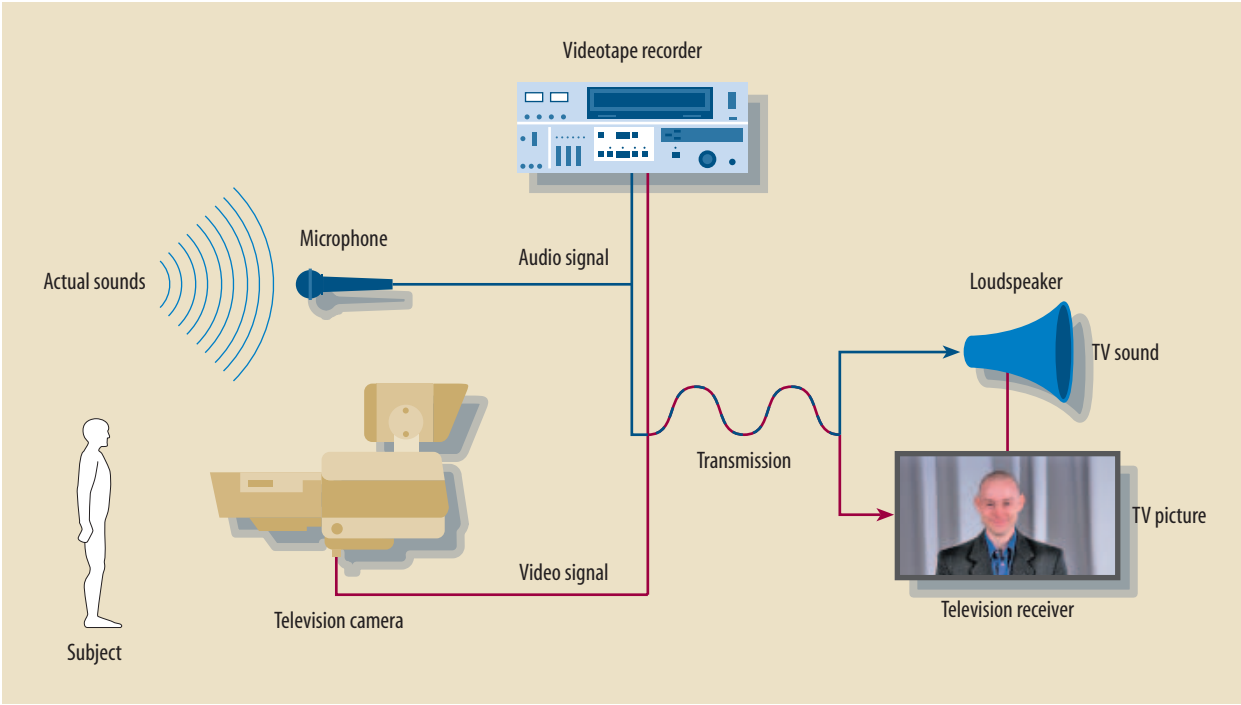
A ***system*** is a collection of elements that work together to achieve a specific purpose. Each of the elements is dependent on the proper workings of all the others, and none of the individual elements can do the job alone. The ***television system*** consists of equipment and people who operate that equipment for the production of specific programs. Whether the productions are simple or elaborate, or originate in the studio or in the *field*—that is, on location—the system works on the same basic principle: the television camera converts whatever it "sees" (optical images) into electrical signals that can be temporarily stored or directly reconverted by the television set into visible screen images. The microphone converts whatever it "hears" (actual sounds) into electrical signals that can be temporarily stored or directly reconverted into sounds by the *loudspeaker.* In general, the basic television system transduces (converts) one state of energy (optical image, actual sound) into another (electrical energy). SEE 1.1 The picture signals are called *video signals,* and the sound signals are called *audio signals.* Any small consumer ***camcorder*** represents such a system.

EXPANDED STUDIO AND ELECTRONIC FIELD PRODUCTION SYSTEMS

The basic television system is considerably expanded when doing a television production in the studio or in the field, such as a telecast of a sporting event. The ***expanded system*** needs equipment and procedures that allow for the selection of various pictures and sound sources; for the control and monitoring of picture and sound quality; for the recording, playback, and transmission of pictures and sound; and for the integration of additional video and audio sources.

SYSTEM ELEMENTS OF STUDIO PRODUCTION

The expanded studio television system in its most elementary stage includes: (1) one or more cameras, (2) a camera control unit (CCU) or units, (3) preview monitors, (4) a switcher, (5) a line monitor, (6) one or more videotape recorders, and (7) a line-out that transports the video signal to the videotape recorder and/or the transmission device. SEE 1.2 Usually integrated into the expanded system are videotape machines for playback, character or graphic generators that produce various forms of lettering or graphic art, and an editing system.



1.1 BASIC TELEVISION SYSTEM
The basic television system converts light and sounds into electrical video and audio signals that are transmitted (wireless or by cable) and reconverted by the television receiver into television pictures and sound.

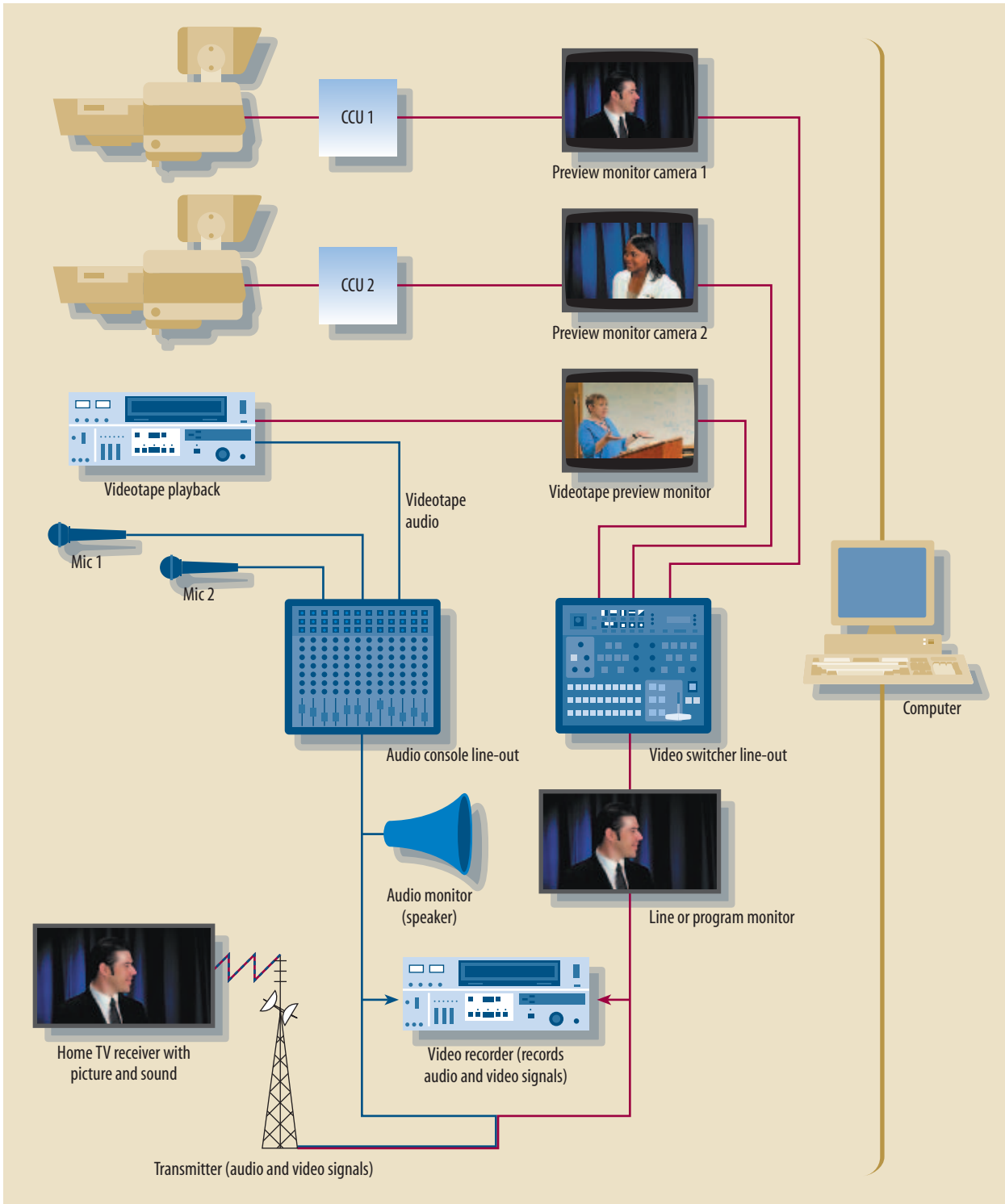
The audio portion of the expanded system consists of (1) one or more microphones, (2) an audio mixer or console, (3) an audio monitor (speaker), and (4) a line-out that transports the sound signal to the video recorder and/or the transmitter (see figure 1.2).

Note that the system elements are identical regardless of whether the individual pieces of equipment are analog or digital.

STUDIO SYSTEM IN ACTION

Let us now put the expanded system to work and see how the various elements interact when a news anchor in the studio introduces a videotape of the school principal showing her guests the new computer lab. Cameras 1 and 2 are focused on the two news anchors. Camera 1 provides a close-up of one of the anchors, and camera 2 shows a close-up of the co-anchor. The video signals from these cameras are fed and quality-controlled by their respective *camera control units* (*CCUs*). The CCUs can enhance and match certain video elements of the pictures sent by the two cameras. With the CCUs the video operator (VO) can, for example, lighten the dark shadow area on the anchor shown on camera 1 and reduce the glare on the co-anchor's forehead as seen by camera 2. Or the video operator can adjust the colors so that they look the same from camera to camera.

The quality-controlled pictures from both cameras are fed into *preview monitors,* one for each camera, so you can see what they look like. A third preview monitor is necessary to show the videotape of the principal. These three video signals (from cameras 1 and 2 and the videotape) are simultaneously fed into the *switcher,* which allows you to select and switch any of the three video feeds to the ***line-out*** for transmission or videotape recording. Pressing the button for camera 1 will put the close-up view of one of the anchors on the *line monitor,* which displays the line-out signals that go on the air or on videotape. Pressing the camera 2 button will put camera 2's close-up of the co-anchor on the line monitor. Pressing the button for the videotape insert will put the principal on the line monitor. Whatever appears on the line monitor will be sent to the line-out that feeds the transmission device (on the air or cable) and/or the video recorder.



1.2 EXPANDED STUDIO TELEVISION SYSTEM
The expanded studio television system contains quality controls (CCU and audio console), selection controls (switcher and audio console), and monitors for previewing pictures and sound.

The signals from the news anchors' microphones are fed into the audio console, as is the audio track of the principal's videotape. The audio console now permits you to select among the anchors' voices and the sound track on the videotape and to control the quality of the three sound inputs. You can, for example, select the voice of the person on the screen, match the volume of the three sound sources (anchor, co-anchor, and principal), or keep one lower than the others.

Unaware of all the complex production maneuvers, the viewer simply sees close-ups of the personable and knowledgeable news anchors introducing the upcoming story about the school principal and then showing the principal walking through the new facilities, pointing proudly to the latest computer equipment.

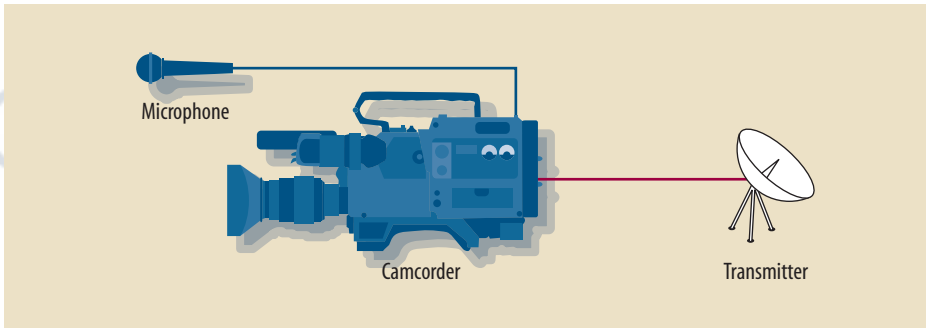
SYSTEM ELEMENTS OF FIELD PRODUCTION

ENG EFP

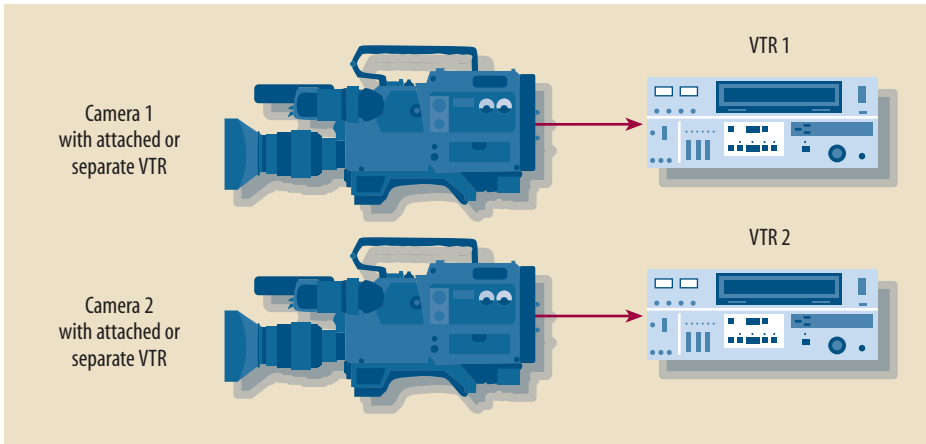
The principal obviously could not bring her new computer lab into the studio, so someone had to go on location to videotape the event. Such location shooting normally falls into the *ENG* (***electronic news gathering***) category and is accomplished with a relatively simple field production system. All you really need is someone who operates the camcorder and a field reporter who describes the action and tries to get some brief comments from the principal and perhaps a teacher or student. Once the footage reaches the newsroom, it is drastically cut and edited to fit the brief time segment (10 seconds or so) allotted to the story.

Had the scene with the principal been a live insert, you would have had to expand the system still further, with a portable transmitter to transport the signal from the field to the station. The ENG signal is often transmitted live to the studio. SEE 1.3

If the field production is not for news or is more elaborate, you are engaged in *EFP* (***electronic field production***). Sometimes field cameras that feed their output to separate *VTRs* (*videotape recorders*) are used. SEE 1.4 *Big remotes* are field productions whose production system is similar to the studio's, except that cameras are placed on location and the control room is housed in a large truck trailer. (For a detailed discussion of EFP and big remotes, see chapter 20.)



1.3 ENG SYSTEM
The basic ENG system consists of a camcorder and a microphone. The camcorder includes all video and audio quality controls as well as video- and audio-recording facilities. A portable transmitter is necessary to send a live field pickup to the studio.



1.4 EFP SYSTEM
The EFP system is similar to that for ENG, but it may use more than one camera to feed the output to separate VTRs.

PRODUCTION ELEMENTS

With the expanded television system in mind, we briefly explore eight basic production elements: (1) the camera, (2) lighting, (3) audio, (4) switching, (5) videotape recording, (6) tapeless systems (7) postproduction editing, and (8) special effects. When learning about television production, always try to see each piece of equipment and its operation within the larger context of the television system, that is, in relation to all the other pieces of equipment that are used and the people who use them—the *production personnel.* It is, after all, the skilled and prudent use of the television equipment by the production team, and not simply the smooth interaction of the machines, that gives the system its value. (The specific roles of the production personnel are outlined in chapter 16.)

CAMERA

The most obvious production element—the *camera*—comes in all sizes and configurations. Some cameras are so small that they fit easily into your coat pocket, whereas others are so heavy that you have to strain yourself to lift them onto a camera mount. The *camera mount* enables the operator to move a heavy camera/lens/teleprompter assembly on the studio floor with relative ease. SEE 1.5 Portable cameras are often used for ENG and EFP.

Many ENG/EFP cameras are camcorders that combine the camera and the videotape recorder in one unit, much like popular consumer models. The ENG/EFP camcorders, however, are of higher quality and cost considerably more. It is often the high-quality lens that distinguishes a professional ENG/EFP camera from a high-end consumer model. Some ENG/EFP cameras are built so that they can "dock" with a videotape recorder, a digital disc, or hard-drive recording unit; such units are simply plugged into the back of the camera to form a camcorder. Regardless of whether the camcorder is analog or digital, its operational features are basically identical. SEE 1.6

The studio television camera has three fundamental parts: the lens, the camera itself, and the viewfinder.

The lens In all *photography* (meaning "writing with light"), the *lens* selects part of the visible environment and produces a small optical image of it. In standard still and movie cameras, the image is then projected onto film; in digital still cameras and television cameras, it is projected onto the *imaging device,* which converts the light from the optical image into an electrical signal. All television cameras have a *zoom lens,* which allows you to smoothly and continuously change from a long shot (showing a wide vista) to a close-up view without moving either the camera or the object you are photographing.

1.5 STUDIO CAMERA WITH PNEUMATIC PEDESTAL
High-quality studio cameras are mounted on a studio pedestal for smooth and easy maneuverability.

The camera itself The camera is principally designed to convert the optical image as projected by the lens into an electrical signal—the video signal. As mentioned earlier, the major conversion element is the imaging device, a small electronic chip called the *CCD* (*charge-coupled device*). It responds to light in a manner that resembles a light meter. When the CCD receives a large amount of light, it produces a strong video signal (just as the needle of a light meter goes way up); when it receives faint light, it produces a weak signal (just as the light meter needle barely moves from its original position). Other optical and electronic components enable the camera to reproduce

1.6 PROFESSIONAL CAMCORDER
The professional camcorder is a highly portable, self-contained camera/video recording unit. It is usually battery-powered.

the colors and the light-and-dark variations of the actual scene as accurately as possible, as well as to amplify the relatively weak video signal so that it can be sent to the camera control unit without getting lost along the way. For both analog and digital cameras, the basic imaging devices are the same.

The viewfinder The *viewfinder* is a small television set mounted on the camera that shows what the camera is seeing. Most viewfinders of professional cameras are *monochrome,* which means that the display is in black-and-white. Many consumer camcorders and some high-quality studio cameras, on the other hand, have color viewfinders, so you can see the color pictures that the camera delivers. Generally, black-and-white viewfinders show more picture detail than color displays do, which makes it easier to achieve sharp focus.

Mounting equipment Portable cameras and camcorders are designed to rest more or less comfortably on your shoulder. But even a small, handheld camcorder can get quite heavy when you operate it for prolonged periods of time. In such cases a *tripod* not only relieves you of having to carry the camera but also ensures steady pictures. The heavy studio cameras also need mounts; these range from tripods, similar to those used for ENG/EFP cameras, to large cranes. The most common studio camera mount is the *studio pedestal* (shown in figure 1.5), which lets you raise and lower the camera and move it smoothly across the studio floor while it is "hot," that is, on the air. Some news studios use robotic cameras that are remotely controlled via computer by a single operator in the studio control room. Because high-quality cameras can be relatively small and light, such robotic systems have become quite popular in newsrooms.

LIGHTING

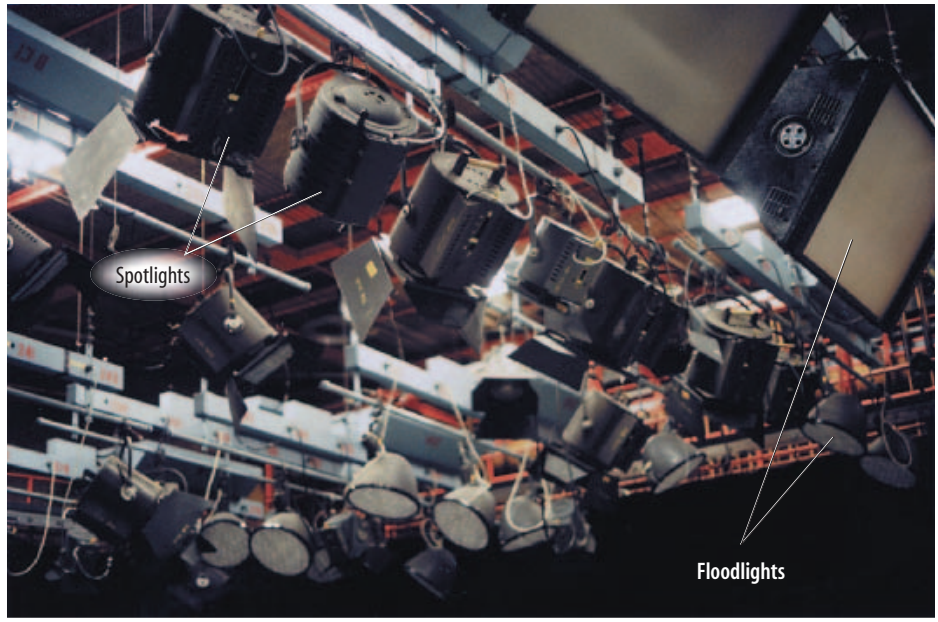
Like the human eye, the camera cannot see well without a certain amount of light. Because it is not objects we actually see but the light reflected off of them, manipulating the light falling on objects influences the way we perceive them on-screen. Such manipulation is called ***lighting.***

Lighting has four broad purposes: (1) to provide the television camera with adequate illumination for technically acceptable pictures; (2) to tell us what the objects shown on-screen actually look like; (3) to show us where the objects are in relation to one another and to their immediate environment, and when the event is taking place in terms of time of day or season; and (4) to establish the general mood of the event.

Types of illumination All television lighting basically involves two types of illumination: directional and diffused. *Directional light* has a sharp beam and produces harsh shadows. You can aim the light beam to illuminate a precise area. A flashlight and car headlights produce directional light. *Diffused light* has a wide, indistinct beam that illuminates a relatively large area and produces soft, translucent shadows. The fluorescent lamps in a department store produce diffused lighting.

Studio lighting consists of carefully controlling light and shadow areas. The lighting requirements for electronic field production are usually quite different from those for studio work. In electronic news gathering, you work mostly with available light or occasionally with a single lighting instrument that gives just enough illumination for the camera to record an event relatively close to the camera. For EFP you also use available light, especially when shooting outdoors, or highly diffused light that provides optimal visibility indoors. Some field productions, such as documentaries or dramatic scenes, require careful interior lighting that resembles studio lighting techniques. The difference is that the location lighting for EFP is done with portable lighting instruments rather than with studio lights, which are more or less permanently installed.

1.7 STUDIO LIGHTING
The typical studio lighting uses spotlights and a variety of floodlights.



Lighting instruments The lighting instruments that produce directional light are called *spotlights,* and the ones that produce diffused light are called *floodlights.* In the television studio, the various types of spotlights and floodlights are usually suspended from the ceiling. SEE 1.7

Studio lights are much too heavy and bulky to be used outside the studio. Most EFPs use portable lighting packages that consist of several small, highly efficient instruments that can be plugged into ordinary electrical outlets. There are also larger fluorescent banks for large-area or virtually shadowless lighting. Most portable instruments can either be mounted on collapsible floor stands or clipped onto doors, windowsills, or furniture. These instruments generally operate as floodlights, but they can be adjusted to function as spotlights as well. To obtain more directional control, EFP lighting packages include a number of small spotlights, which can be diffused with a collapsible diffusion tent, often called *soft box* (see chapter 7). SEE 1.8

Lighting techniques All television lighting is based on a simple principle: use some instruments (usually spotlights and floodlights) to illuminate specific areas, soften shadows, and bring the overall light on a scene to an intensity level at which the cameras can generate optimal pictures. In general, television lighting has less contrast between light and shadow areas than do film and theater lighting. Diffused light is therefore used extensively in television lighting, especially on news and interview sets, for game shows and situation comedies, and in many field productions.

AUDIO

Although the term *television* does not include audio, the sound portion of a television show is nevertheless one of its most important elements. Television audio not only communicates precise information but also contributes greatly to the mood and the atmosphere of a scene. If you were to turn off the audio during a newscast, even the best news anchors would have difficulty communicating their stories through facial expressions, graphics, and video images alone. The aesthetic function of sound (to make us perceive an event or feel in a particular way) becomes obvious when you listen to the background sounds during a crime show, for example. The squealing tires during a high-speed chase are real enough, but the rhythmically fast, exciting background music that accompanies the scene is definitely artificial. After all, the getaway car and the police car are not followed in real life by a third vehicle with musicians playing the background music. But we have grown so accustomed to such devices that we probably would perceive the scene as less exciting if the music were missing.

The various audio production elements are microphones, ENG/EFP and studio sound control equipment, and sound recording and playback devices.

1.8 PORTABLE LIGHTING INSTRUMENTS
Portable lighting instruments consist of versatile spotlights and floodlights that can be plugged into regular household outlets.

Microphones All microphones convert sound waves into electric energy—the audio signals. The sound signals are amplified and sent to the loudspeaker, which reconverts them into audible sound. The myriad microphones available today are designed to perform different tasks. Picking up a newscaster's voice, capturing the sounds of a tennis match, and recording a rock concert—all may require different microphones or microphone sets.

ENG EFP **ENG/EFP sound control equipment** In ENG the audio is normally controlled by the camera operator, who wears a small earphone that carries the incoming sound. Because the camera operator is busy running the camera, the sound controls on the camcorder are often switched to the *automatic* setting. In the more critical EFP, the volume of incoming sounds is usually controlled by a portable *mixer* and recorded not only on videotape but also on a portable audiotape recorder. SEE 1.9

1.9 AUDIO MIXER
The portable audio mixer has a limited amount of inputs and volume controls.

1.10 AUDIO CONSOLE
Even a relatively simple audio console has many controls to adjust the volume and the quality of each incoming sound signal and to mix them in various ways.

Studio sound control equipment The *audio console* is used to control the sounds of a program. At the audio console, you can (1) select a specific microphone or other sound input, (2) amplify a weak signal from a microphone or other audio source for further processing, (3) control the volume and the quality of the sound, and (4) *mix* (combine) two or more incoming sound sources. SEE 1.10

Recall the example of the news anchor introducing a videotape of the principal and visitors at the new computer lab. The first two audio inputs come from the signals of the two anchors' microphones. Because the principal is busy escorting the visitors into the room, one of the news anchors talks over the initial part of the videotape insert. To convey a sense of actuality, you can mix under the anchor's narration the actual sounds on the videotape—the excited voices of the parents, a question or comment by one of the reporters, and the occasional laughter of the students. Then, when the principal finally begins to speak, you increase the volume of the videotape sound track and switch off both anchors' microphones.

Sound recording and playback devices Even when an event is recorded on videotape for postproduction, its sounds are usually recorded at the same time as the picture. In ENG the pictures, the reporter's voice, and the ambient sounds are picked up and recorded simultaneously. In EFP most speech sounds, such as an interviewer's questions and the interviewee's answers, are recorded on location with the picture. Some sounds, such as musical bridges and a narrator's voice-over, are usually added in postproduction. But even in more-complicated studio productions such as soap operas, the background music and the sound effects are often added during the live pickup of the actors' dialogue.

In large and complex studio productions in which a single camera shoots a scene piecemeal, much in the way films are made, the audio track is subjected to much manipulation in postproduction. The sounds of explosions, sirens, and car crashes, for example, are normally *dubbed in* (added) during the postproduction sessions. Even parts of the original dialogue are occasionally re-created in the studio.

Prerecorded sound, such as music, is usually played back from various digital storage devices, such as digital audiotape (DAT), compact discs (CDs), and digital computer disks. Various compression techniques allow a great amount of such audio information to be recorded digitally without the need for excessive storage space.

SWITCHING

The *switcher* works on a principle similar to that of push buttons on a car radio, which allow you to select certain radio stations. The switcher lets you select various video sources, such as cameras, videotape, and titles or other special effects, and join them through a great variety of transitions while the event is in progress. In effect, the switcher allows you to do *instantaneous editing.*

Before learning about the switcher, look for a moment at the diagram in figure 1.2 of the expanded studio television system. Cameras 1 and 2 deliver their pictures first

1.11 VIDEO PRODUCTION SWITCHER
The production switcher has several rows of buttons and other controls for selecting and mixing various video inputs and creating transitions and special effects. It then sends the selected video to the line-out.

1.12 VIDEOTAPE RECORDER
Almost all VTRs use videocassettes for recording and playback. All professional VTRs have various video- and audio-recording, playback, and editing controls.

to the CCUs and then to the preview monitors. Preview monitor 1 shows all the pictures that camera 1 is taking, and preview monitor 2 carries the pictures of camera 2. Preview monitor 3 shows the selected videotape recordings. These three video signals are fed into the switcher. Each source (camera 1, camera 2, and VTR) has its own switcher input. Pressing the camera 1 button puts camera 1's signal on the line-out and shows its pictures on the line monitor. Pressing the camera 2 button puts camera 2's pictures on the line monitor and on the line-out. Pressing the VTR button puts the pictures of the videotape on the line monitor and the line-out. This switcher "output" (line-out) is what goes on the air or is recorded on videotape.

Any switcher, simple or complex, can perform three basic functions: (1) select an appropriate video source from several inputs, (2) perform basic transitions between two video sources, and (3) create or retrieve special effects, such as split screens. Some switchers have further provisions for remotely starting and stopping various video recorders. SEE 1.11

VIDEOTAPE RECORDING

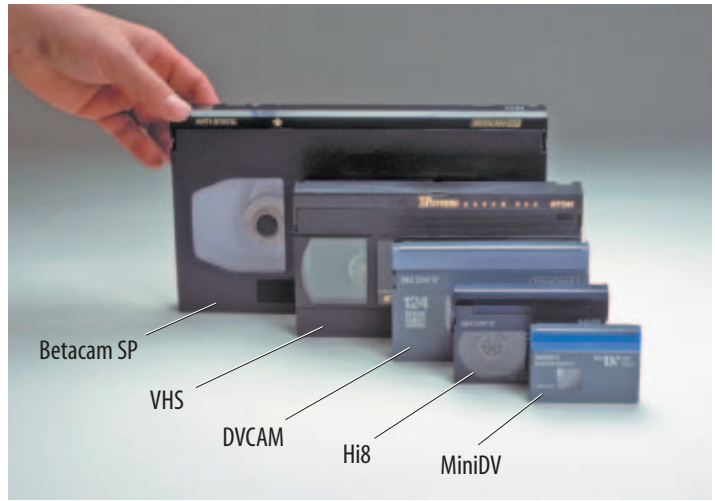
Most television shows are recorded on videotape or computer disk before they are aired. Even live football broadcasts include plenty of prerecorded material. The "instant replays" are nothing but digital replays of key moments after the fact. Videotape or a computer hard disk is used for the playback of commercials, even those originally produced on film.

One of the unique features of television is its ability to transmit a telecast *live*, which means capturing the pictures and the sounds of an ongoing event and distributing them instantly to a worldwide audience. Most television programs, however, originate from playback of previously recorded material. Videotape is still an indispensable medium for *production* (the recording and building of a show), for *programming* (when and over which channel the show is telecast), and for distribution.

Videotape recorders Because videotape will be in use for some time to come, you must acquaint yourself with the basics of videotape recording. All videotape recorders, analog and digital, work on the same principle: they record video and audio signals on a single strip of plastic videotape and later reconvert them into signals that can be seen as pictures and heard as sound on a television receiver. Most VTRs use videotape cassettes, similar to the ones you use in your camcorder or home *VCR* (*videocassette recorder*). Professional videotape recorders are similar to a home machine, except that they have more operational controls, more-rugged tape drives, and more-sophisticated electronics that ensure higher-quality pictures and sound. SEE 1.12

Videotape recorders are classified by whether the recording is done in digital or analog form; by the electronic system used for the recording (Betacam SP or SX, DVCAM, DVCPRO, S-VHS, Hi8, or VHS); and sometimes by the tape *format* (the width of the videotape in the

1.13 VARIOUS CASSETTE FORMATS
Videocassettes come in a variety of sizes and are manufactured for specific recording systems.



videocassette). Many VTR systems use ½-inch videocassettes (Betacam SP, digital Betacam SX, Digital-S, S-VHS, and VHS), but there are also systems that use small 8mm cassettes (Hi8) or even narrower digital ¼-inch cassettes (6.35mm DVCAM and DVCPRO). SEE 1.13

TAPELESS SYSTEMS

Great and rapid progress is being made toward a tapeless environment wherein all video recording, storage, and playback is done with non-tape-based systems. Such a ***tapeless system*** makes use of memory sticks and cards, optical discs such as CDs and DVDs, and large-capacity computer disks rather than videotape.

Memory sticks and cards These small yet powerful memory devices are used in some cameras to record brief video sequences. Some cameras also use them as a video buffer: such a prerecord device allows you to have the camera on and capture footage while running toward a news event, without using tape. By pressing the *record* button, you can then transfer this footage—dump it—onto videotape.

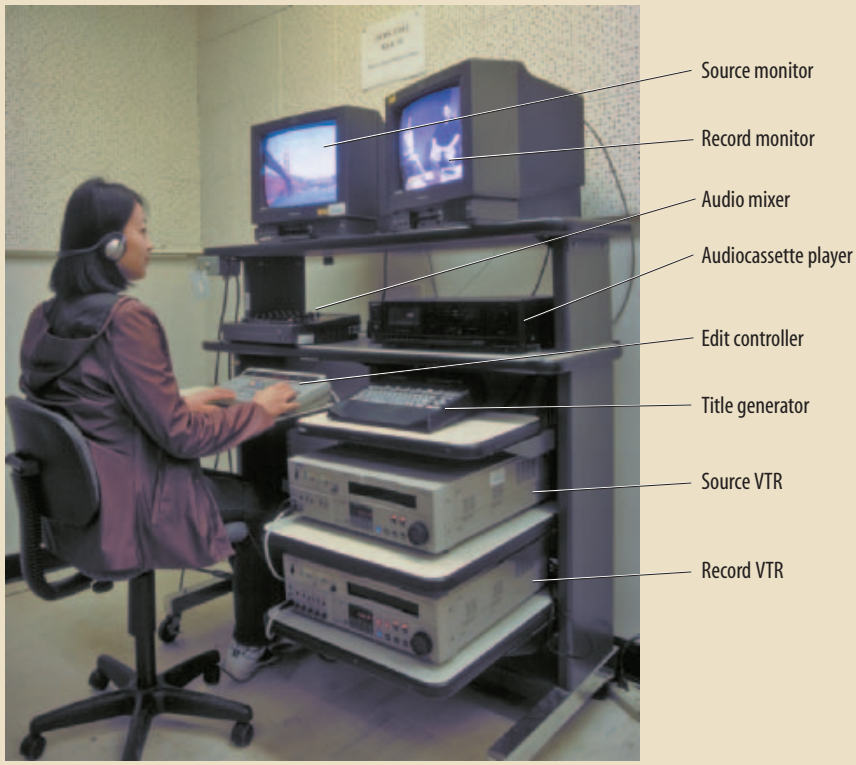
Optical discs and hard drives Optical discs such as *CD-ROMs* (compact disc–read-only memory) and *DVD-ROMs* (digital versatile disc–read-only memory) are *read-only,* meaning you can play back the information on the disc but you cannot record your own material onto it. Digital read/write discs such as *CD-RWs* (compact disc–read/write) and *DVD-RWs* (digital versatile disc–read/write) let you record and play back entire video sequences and reuse them for other recordings.

Some camcorders use small but high-capacity *hard drives* instead of videotape to capture and play back video and audio information. High-capacity hard drives are used extensively for the storage, manipulation, and retrieval of video and audio information by desktop computers in postproduction. Hard drives that are even larger (in the multi-terabyte range) have all but replaced videotape as the storage and playback device of daily programming in television stations.

Note that the optical, laser-activated discs are spelled with a *c,* and the disks used in hard drives are spelled with a *k.*

POSTPRODUCTION EDITING

For some people postproduction editing is heaven: they feel totally in command of putting together the bits and pieces of recorded material into a story that tells the event in a clarified and intensified way. For others it is a tedious, albeit necessary, evil. Irrespective of how you feel about postproduction, it is usually the most expensive and time-consuming production phase. In principle, *postproduction editing* is relatively simple: you select the most effective shots from the original source material, usually on videotape, and copy them onto another videotape in a specific order. In practice, however, postproduction editing can be extremely complicated, involving such fundamentally different systems as nonlinear and linear editing and special-effects equipment.



1.14 LINEAR EDITING SYSTEM
The linear, cuts-only editing system consists of a source VTR and a record VTR, source and record monitors, an edit controller, a title generator, an audiocassette player, and an audio mixer.

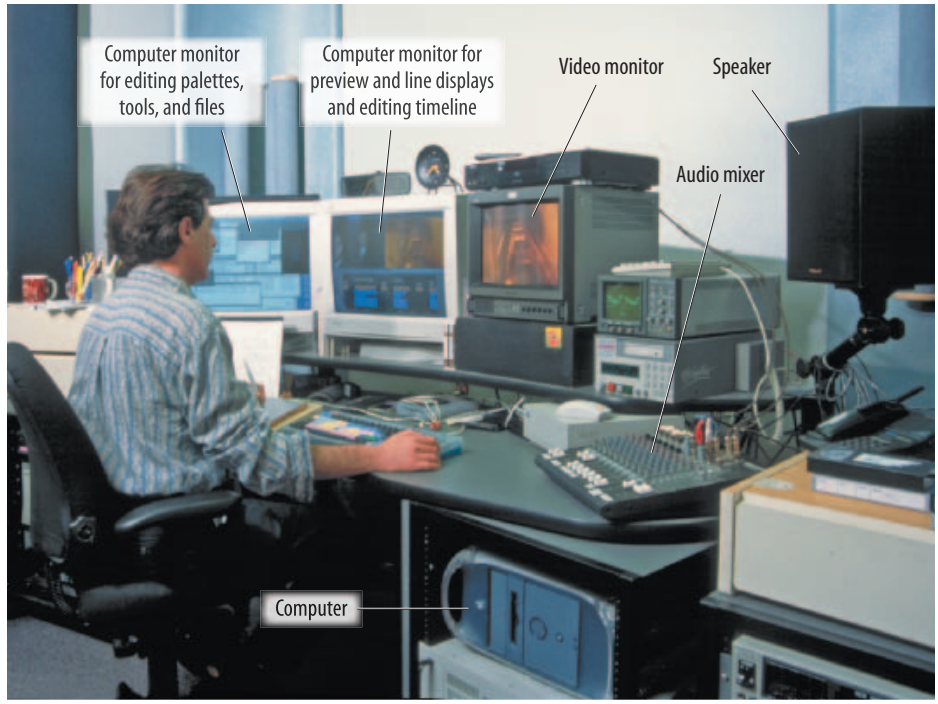
In *nonlinear editing* you transfer all source footage (videotape or camcorder disks) to a computer disk and then edit the video and audio portions pretty much as you would edit text with a word-processing program. You call up, move, cut, paste, and join the various shots much like words, sentences, and paragraphs when editing a document. Most nonlinear software programs let you produce an *edit decision list* (*EDL*) and either low-resolution or high-resolution full-frame, full-motion video and audio sequences. The final high-resolution editing sequence is then transferred directly onto an edit master tape for on-the-air use. The *linear editing* system normally requires two *source VTRs,* which contain the original material that you recorded with your camera or cameras, and the *record VTR,* which produces the final edit master tape.

The computer plays an important role in both linear and nonlinear editing. In linear editing the computer acts as an *edit controller* (also called an *editing control unit*), which helps find a particular scene quickly and accurately, even if it is buried midtape. It starts and stops the source and record machines and tells the record VTR to perform the edit at the precise point you have designated. SEE 1.14

Nonlinear editing is done exclusively with a computer. Once the analog video and audio information on the source tapes has been digitized and stored on the high-capacity hard drives, you do not need VTRs in the editing process. You can simply call up particular shots and see whether they provide the desired sequence. The software programs for nonlinear editing also offer a wide choice of electronic effects and transitions. SEE 1.15 Once you have decided on the sequencing, transitions, and effects, you can tell the computer to print out an EDL. This list is necessary for editing the source tapes into the final edit master tape. Some systems provide the EDL and the sequenced audio and video material for the final edit master tape without having to go back to the original source tapes.

Keep in mind that even the most elaborate digital editing system cannot make the creative decisions for you.

1.15 NONLINEAR EDITING SYSTEM
In nonlinear editing, all audio and video information is stored on large-capacity hard drives. You manipulate pictures and sound with the computer much like words and paragraphs during word processing.



You can improve on the original source footage, such as by balancing the colors from shot to shot, but the better the original material is, the easier and more efficient the postproduction activities will be. Thinking about postproduction as early as the shooting stage facilitates your editing chores considerably. Always consider postproduction an extension of the creative process, not a salvage operation.

SPECIAL EFFECTS

Special effects can be as simple as adding a title over a background scene, done with a *character generator* (*C.G.*), or inserting the well-known box over the newscaster's shoulder. SEE 1.16 Or they can be as elaborate as the gradual transformation of a face into a series of intensely colored, mosaic-like screen patterns. SEE 1.17

1.16 TITLE KEY
One of the most common effects is lettering *keyed* (cut into) a background scene. The key looks as though the title is printed on top of the background image.

1.17 MOSAIC EFFECT
Various special-effects devices can create or alter video images without the aid of a video camera. This mosaic effect was created by the digital manipulation of a video picture.

A character generator is a dedicated computer system used exclusively for still or animated titles and relatively simple special effects. With the right software, you can use your desktop computer as a C.G. for simple titles. A *graphics generator* produces a number of static or animated two- and three-dimensional images. The complex weather maps in television newscasts are usually done with a graphics generator. Using software and a standard desktop computer, you can create stunning special effects. Even simple switchers have an abundance of built-in special effects that allow you to generate a great variety of (often unnecessary) transitions. These effects are used frequently in television news, music videos, and commercials and are explored in depth in chapters 14 and 15.

MAIN POINTS

- The basic television system consists of equipment and the people who operate the equipment to produce specific programs. In its simplest form, the system consists of a television camera that converts what it sees into a video signal, a microphone that converts what it hears into an audio signal, and a television set and a loudspeaker that reconvert the two signals into pictures and sound.
- The expanded studio television system adds equipment and procedures to the basic system to make possible a wider choice of sources, better quality control of pictures and sound, and the recording and/or transmission of video and audio signals.
- The ENG (electronic news gathering) television system consists basically of a camcorder and microphones. The EFP (electronic field production) system may include multiple camcorders or field cameras and some lighting and audio/video control equipment.
- The major production elements are the camera, lighting, audio, switching, videotape recording, tapeless systems, postproduction editing, and special effects.
- All television cameras have three main parts: the lens; the camera itself with the camera imaging device (the CCD), which converts an optical image into an electrical signal; and the viewfinder, which reconverts the signal into visible images.
- Lighting is the manipulation of light and shadows that influences the way we perceive objects on-screen and how we feel about a screen event.
- The two types of illumination are directional light, produced by spotlights, and diffused light, produced by floodlights.
- Audio, the sound portion of a television show, is necessary to give specific information about what is said and to help set the mood of a scene.
- Audio production elements include microphones, sound control equipment, and sound recording and playback devices.
- The switcher enables us to do instantaneous editing by selecting a specific picture from several inputs and performing basic transitions between two video sources.
- There is a variety of analog and digital videotape recorders, which differ in terms of the electronic system used for recording as well as tape format and quality.
- Television production is fast becoming a tapeless environment in which all video recording, storage, and playback is done with non-tape-based systems. These include memory sticks and cards, optical discs such as CDs and DVDs, and large-capacity computer disks.
- Postproduction editing involves selecting various shots from the source material and putting them in a specific sequence. In nonlinear editing, the digital video and audio material is stored on a computer disk and manipulated using a computer program. Most nonlinear editing systems produce an edit decision list (EDL) and high-quality video and audio sequences that can be transferred directly to the edit master tape. In linear editing, videotape is used as the source material and for the final edit master tape.
- Special effects are an important ingredient in video presentation. They range from simple lettering, produced by a character generator (C.G.), to elaborate effects, produced by a graphics generator. The right software can make your desktop computer a C.G. or graphics generator.

SECTION

1.2

Studios, Master Control, and Support Areas

Telecasts can originate anywhere, indoors or out, so long as there is enough light for the camera to see. With the highly portable, battery-powered cameras and recording facilities and the mobile microwave transmitters, television has the whole earth as its stage. Our ability to transmit television programming from just about anywhere does not render the studio obsolete, however. Television studios persist because, if properly designed, they offer maximum control and optimal use of the equipment. This section focuses on the three major television production centers.

- **TELEVISION STUDIO**
  The origination center where television production takes place
- **STUDIO CONTROL ROOM**
  Where directors, producers, and technical personnel exercise program control, switching, audio control, lighting control, and video control
- **MASTER CONTROL**
  The technical nerve center of a station, with tape-based or tapeless program input, program storage, and program retrieval
- **STUDIO SUPPORT AREAS**
  Space for scene and property storage and for makeup and dressing rooms

TELEVISION STUDIO

A well-designed studio provides for the proper environment and coordination of all major production elements—cameras, lighting, sound, scenery, and the action of performers. Here we explore the physical layout of a typical studio and the major studio installations.

PHYSICAL LAYOUT

Most studios are rectangular with varying amounts of floor space. Because the zoom lens can make a scene look closer or farther away, it has drastically reduced the need for actual camera movement, but room size nevertheless greatly affects production complexity and flexibility.

Size The larger the studio, the more complex the productions can be and the more flexible they will be. If all you do in the studio is news and an occasional interview, you may get by with amazingly little space. In fact, some news sets are placed right in the middle of the actual newsroom. SEE 1.18 Other news sets may take up a substantial portion of a large studio.

Elaborate productions, such as musical or dance numbers, dramas, or audience participation shows, need large studios. It is always easier to produce a simple show in a large studio than a complex show in a small one. The larger the studio, however, the more difficult it is to manage, requiring more equipment and qualified people to properly run it. Medium-sized or even small studios are generally more efficient to manage, but they are not as flexible.

Floor The studio floor must be even and level so that cameras can travel smoothly and freely. It should also be hard enough to withstand the moving about of heavy equipment, scenery, and set properties. Most studios have concrete floors that are polished or covered with linoleum, tile, or hard plastic.

Ceiling height Adequate ceiling height—a minimum of 12 feet—is one of the most important design features of a television studio. If the ceiling is too low, the lights are too close to the scene for good lighting control and there is not enough room above them for the heat to dissipate. Also, the low lights and the boom microphone will encroach into the scene, as well as make it uncomfortably hot. Higher ceilings can accommodate even tall scenery. Many large studios therefore have ceilings more than 30 feet high.

1.18 NEWS SET IN NEWSROOM
This news set is part of a working newsroom. It is designed to project the up-to-date character of the news presentation.

Acoustic treatment The studio ceiling and walls are usually treated with acoustic material that prevents sound from bouncing indiscriminately around the studio. This is why television studios sound "dead." When you clap your hands in an acoustically treated studio, the sound seems to go nowhere; in a more "live" studio, you hear reverberations, similar to a slight echo.

Air-conditioning Because television studios typically have no windows (to keep out noise and light), air-conditioning is essential. Incandescent studio lights generate a great amount of heat, which has an adverse effect on performers and delicate electronic equipment. Unfortunately, many air-conditioning systems are too noisy for studio productions and must be turned off during the recording of a show—just when cool air is needed the most.

Doors Studios need heavy, soundproof doors that are large enough to accommodate scenery, furniture, and even vehicles. Few things are more frustrating than trying to squeeze scenery and properties through undersized studio doors or to have the doors transmit outside sounds, such as a fire truck screaming by, right in the middle of a show.

MAJOR INSTALLATIONS

All studios need major installations that facilitate the production process.

Intercommunication system The intercommunication system, or ***intercom,*** allows all production and engineering personnel actively engaged in a production to be in constant voice contact with one another. For example, the director, who sits in the control room physically isolated from the studio, has to rely totally on the intercom to communicate cues and instructions to the production team. In most small stations, the *P.L.*(private line or phone line) system is used. Each member of the production team wears a telephone headset with an earphone and a small microphone for talkback. Larger stations use a wireless intercom system. (For a more thorough discussion of intercom systems, see chapters 19 and 20.)

Studio monitors Studio ***monitors*** are high-quality television sets that display the video feed from the program switcher. Contrary to the television set in your home, a monitor cannot receive a broadcast signal. A studio monitor is an important production aid for both crew and talent. The production crew can see the shots the director has selected and thus anticipate their future tasks. For example, if you see that the on-the-air camera is on a close-up rather than a long shot, you can work closer to the set without getting into camera range. Also, after seeing that one camera is on a close-up, the other camera operators can go to different shots to give the director a wider choice. The studio monitor is essential for the newscaster

to see whether the various tape or live inserts are actually appearing as per the script. Sometimes laptop computer screens serve as monitors for news anchors. In audience participation shows, several studio monitors are usually provided so that the studio audience can see how the event looks on-screen.

Program speakers The ***program speakers*** (also called *audio monitors*) fulfill a function for audio similar to what the studio monitors do for video. Whenever necessary they can feed into the studio the program sound or any other sound—dance music, telephone rings, or other sound effects—to be synchronized with the studio action.

Wall outlets As insignificant as they may seem at first, the number and the locations of wall outlets are critical factors in studio production. The outlets for camera and microphone cables, intercoms, and regular household current should be distributed along the four studio walls for easy access. If all the outlets are on one side of the studio, you will have to string long and cumbersome cables around the various sets to get equipment into the desired positions. Outlets must be clearly labeled to avoid patching cables into the wrong type of outlet.

Lighting dimmer and patchboard Most studios have a dimmer control board to regulate the relative intensity of the studio lights. The lighting *patchboard,* or patchbay, connects the individual instruments to the various dimmers. Unless the patching is done by computer, the patchboard is usually located in the studio. The dimmer board itself is either in a corner of the studio or in the control room (discussed in detail in section 7.1).

STUDIO CONTROL ROOM

The ***control room,*** adjacent to the studio, is where all the production activities are coordinated. Here the director, the associate director (AD), the technical director (TD), and a variety of producers and production assistants make the decisions concerning maximally effective picture and sound sequences, which are to be videotaped or broadcast live. SEE 1.19

1.19 STUDIO CONTROL ROOM
All control rooms have distinct controlling areas: the program control, the switcher, the audio control, and sometimes the lighting and video controls. The audio control is in an adjacent room.

PROGRAM CONTROL

Program control does not mean the critical examination, or perhaps even censoring, of program content; it refers to the equipment the director needs to select and organize the various video and audio inputs so that the end result makes sense to the viewing audience. The program control area of the control room is equipped with (1) video monitors, (2) speakers for program sound, (3) intercom systems, and (4) clocks and stopwatches.

Video monitors Even a simple control room holds an amazingly large number of video monitors. There is a (usually black-and-white) ***preview (P/V) monitor*** for each of the studio cameras and separate preview monitors for videotape recorders, the C.G., and other special-effects devices. There is also a larger color P/V monitor that shows the director and the technical director the upcoming picture before it is punched up (put on the air), as well as the large color ***line monitor***, which is fed by the video line-out. If you do a live remote or are connected with a television network, you need at least two more monitors to preview the remote and network sources. Finally, the off-the-air television set receives the broadcast signal that you are telecasting. It is not uncommon to find thirty or more monitors in the control room of a medium-sized studio. SEE 1.20

Speakers for program sound The production personnel in the control room, especially the director, must hear what audio is going on the air. The director can adjust the volume of the monitor speaker without influencing the volume of the line-out audio.

Intercom systems In addition to the all-important P.L. system that connects the director with all the other members of the production crew, there is the *P.A.* (public address system), or simply the director's studio talkback. The ***studio talkback*** allows the director to talk directly to the crew or talent in the studio when the show is not in progress, but the studio people cannot use this system to communicate with the control room. With the *I.F.B.* (interruptible foldback or feedback) *system*, the director and the producers can talk to the talent while the show is on the air.

Clocks and stopwatches Time is an essential organizing element in television production. Programs are aired according to a second-by-second schedule called the *log*. The two timing tools for the director are the clock and the

1.20 CONTROL ROOM MONITORS
Each of these monitors shows a specific video image as supplied by video sources such as studio cameras, VTRs, the C.G., special effects, or remote satellite feeds. The large preview monitor shows the upcoming shot. The large line monitor shows what goes on the air (and/or on videotape).

stopwatch. The clock indicates when a certain program should start or finish. All television clocks in the United States are precisely synchronized. The stopwatch is used for timing inserts, such as a 20-second videotaped public service announcement (PSA) within a news program. Most control rooms have a regular clock (with hands), a digital clock (showing time in numbers), and digital stopwatches that can run forward and backward. The advantage of a clock with hands is that you can look forward in time and, for example, actually see how much time you have left until the end of a program. The digital clock simply indicates where you are at a precise moment in time.

SWITCHING

Switching refers to the selection and proper sequencing of video images as supplied by cameras or other video sources. It also includes the control of video special effects. The main piece of image control equipment is the *switcher,* which is located next to the director's position (see figure 1.19). Although the director and the person doing the switching (usually the technical director) are connected via the P.L., the director often resorts to pointing and finger snapping to speed up the cues to the TD. In small stations the director sometimes does his or her own switching, but that arrangement has more disadvantages than advantages. The C.G. is also located in the control room so that the C.G. operator can call up the various preprogrammed titles or create new ones even during the show.

The program control section sometimes houses the computer and the control panel for robotic cameras. A single robotic-camera operator can then operate all cameras from the control room.

AUDIO CONTROL

The audio control booth can be considered a small radio station adjacent to the studio control room. It usually houses the audio console and a patchbay (or patch panel), as well as audiotape recorders, DAT machines, CD and DVD players, or other read/write digital devices. The audio engineer can listen to a cue speaker when cueing an upcoming audio source and the program sound on high-quality program speakers. The audio booth also contains a clock and a line monitor. SEE 1.21 Because the audio engineer must be able to work undisturbed by the apparent confusion and inevitable noise in the control room, the audio control booth has visual contact with the control room through a large window but is otherwise self-contained. The audio engineer listens to the director's cues through either the P.L. system or a small intercom speaker.

LIGHTING CONTROL

The lighting control board can be located in the control room or in a corner of the studio. The advantage of placing it in the control room is that the lighting director (LD) has close contact with other control room personnel. The lighting control operator is, as are all other pro-

1.21 AUDIO CONTROL
The audio control area contains the audio console, patchbays, DAT machines, other digital record/play devices, various computers that display log information or assist with the audio control functions, and a monitor that shows the line-out video.

duction team members, connected with the director via the P.L. system.

VIDEO CONTROL

The video controls allow the video operator to achieve optimal pictures. Most often the cameras are set up for the prevailing lighting before the show, and then adjusted as necessary during the show.

MASTER CONTROL

Master control is the nerve center of a television station. Every second of programming you see on your home screen has gone through the master control room of the station to which you are tuned. Master control acts as a clearinghouse for all program material. It receives program ***feeds*** from various sources then telecasts them at a specific time. Many of the programs are still on videotape but are usually transferred to the large-capacity hard drives of video servers (large computers). The advantage of tapeless master control operation is that the servers allow easy sequencing of program events, highly precise starts and stops, and a high degree of automation. SEE 1.22

The major responsibility of master control is to see that the right program material (including commercials and PSAs) is broadcast at the right time. Master control is also responsible for the technical quality of the programs: it has to check all program material against technical standards set by the Federal Communications Commission (FCC) and a critical chief engineer.

The specific activities of master control consist of (1) program input, (2) program storage, and (3) program retrieval.

PROGRAM INPUT

Program material may reach master control directly from its own studios; via satellite or other remote feeds, such as a network show or a live telecast outside the studio; or by courier in the form of videotape. The live shows are routed through master control to the transmitter for broadcast, but the bulk of the program material must be stored before being aired.

Master control also airs the various station breaks. A *station break* is the cluster of commercials, teasers about upcoming programs, PSAs, and station identifications that appears between programs.

In nonbroadcast production centers, *master control* refers to a room that houses the camera control unit (CCU), the high-end video-recording equipment, special-effects devices, large-capacity computers that perform a variety of production functions, and test equipment.

PROGRAM STORAGE

All recorded program material (videotaped or captured digitally on other video-recording devices) is stored in master control itself or in a designated storage room. Each

1.22 MASTER CONTROL SWITCHING AREA
Master control serves as the final video and audio clearinghouse for all program material before it is broadcast or distributed by other means (satellite or cable). Computers run all master control functions, with the master control technician overseeing the automated functions and, if necessary, taking over control manually in case of emergency.

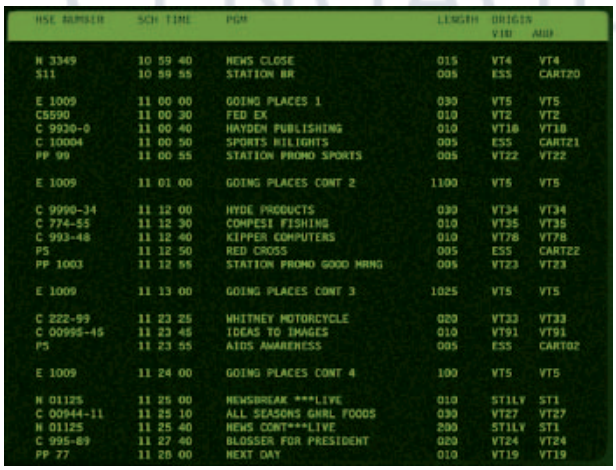
program is given a station code, or ***house number,*** for fast identification and retrieval. Although computer retrieval has introduced some commonality in terms, many stations have their own procedures and codes.

PROGRAM RETRIEVAL

Program retrieval involves the selection, ordering, and airing of all program material. It is determined by the program ***log,*** the second-by-second list of every program aired on a particular day. The log contains information necessary for efficient station operation: it identifies scheduled program time, length, and title; video and audio origin (videotape, server, network, live, or remote); house numbers; and other pertinent information such as the name of the sponsor. The log is issued daily, usually one or two days in advance. Most stations display the log on computer screens but may also distribute a hard copy to key personnel. SEE 1.23

The master control switching area looks like the combined program control and switching areas of the studio control room. Master control has preview monitors for all studio cameras, videotape recorders, special effects, and network and other remote feeds, plus at least one off-the-air monitor.

Although all master control switching is done by computer, most master controls also have a manual switcher, which looks similar to the studio switcher, as a fail-safe backup device. When the computer goes down, the master control technician must take over and use the manual switcher for all on-the-air program sequences. When all is going well, the computer switching will follow the sequence of events as dictated by the log. The computer will also activate various playback operations. For example, it can start a specific server and switch the picture and sound on the air at a precise time, change to a still picture and play an audio recording of the announcer's voice, switch to another spot in the server or play a brief VTR insert, and then switch to the network program. If the house number of the actual program does not match the number specified in the log, the computer can flash a warning in time to correct the possible mistake.



HSE NUMBER	SCH TIME	PGM	LENGTH	ORIGIN VID	ORIGIN AUD
N 3349	10 59 40	NEWS CLOSE	015	VT4	VT4
S11	10 59 55	STATION BR	005	ESS	CART20
E 1009	11 00 00	GOING PLACES 1	030	VT5	VT5
C5590	11 00 30	FED EX	010	VT2	VT2
C 9930-0	11 00 40	HAYDEN PUBLISHING	010	VT18	VT18
C 10004	11 00 50	SPORTS HILIGHTS	005	ESS	CART21
PP 99	11 00 55	STATION PROMO SPORTS	005	VT22	VT22
E 1009	11 01 00	GOING PLACES CONT 2	1100	VT5	VT5
C 9990-34	11 12 00	HYDE PRODUCTS	030	VT34	VT34
C 774-55	11 12 30	COMPESI FISHING	010	VT35	VT35
C 993-48	11 12 40	KIPPER COMPUTERS	010	VT28	VT28
P5	11 12 50	RED CROSS	005	ESS	CART22
PP 1003	11 12 55	STATION PROMO GOOD MRNG	005	VT23	VT23
E 1009	11 13 00	GOING PLACES CONT 3	1025	VT5	VT5
C 222-99	11 23 25	WHITNEY MOTORCYCLE	020	VT33	VT33
C 00998-45	11 23 45	IDEAS TO IMAGES	010	VT91	VT91
P5	11 23 55	AIDS AWARENESS	005	ESS	CART02
E 1009	11 24 00	GOING PLACES CONT 4	100	VT5	VT5
N 01125	11 25 00	NEWSBREAK ***LIVE	010	ST1LV	ST1
C 00944-11	11 25 10	ALL SEASONS GNRL FOODS	030	VT27	VT27
N 01125	11 25 40	NEWS CONT***LIVE	200	ST1LV	ST1
C 995-89	11 27 40	BLOSSER FOR PRESIDENT	020	VT24	VT24
PP 77	11 28 00	NEXT DAY	010	VT19	VT19

1.23 COMPUTER DISPLAY OF LOG
The program log shows the schedule (start) times for each program segment, however short; program title and type; video and audio origin; the identification (house) number of the various program pieces; and sometimes other important information, such as the name of the sponsor.

STUDIO SUPPORT AREAS

No studio can function properly without a minimum of support areas. These include space for scene storage, property storage, and makeup and dressing rooms.

SCENERY AND PROPERTIES

Television scenery consists of the three-dimensional elements used in the studio to create a specific environment for the show or show segment. The most common scenic element is the *flat,* a wood frame covered with soft material (muslin or canvas) or hardwall (plywood or various types of fiberboard). The flat is generally used to simulate walls. Other scenic elements include columns, pedestals, platforms, doors, windows, and steps.

Furniture, curtains, hanging pictures, lamps, books, desks, and telephones are considered the properties, or *props,* and set dressings. The props used to make the set functional, such as tables and chairs, are the *set properties.* Items handled by the performers, such as the telephone, are called *hand properties.* Pictures, indoor plants, sculptures—and anything else used to dress up the set—constitute the *set dressings.*

Depending on the type of show, a set will simulate a real environment, such as a living room, or simply provide an efficient and attractive workspace, such as an interview set. SEE 1.24 Whatever the purpose of the set, it must allow for good lighting, favorable camera angles, optimal camera and microphone placement or movement, and smooth and logical action of the performers.

Producing a large number of vastly different television programs, from daily newscasts to complex dramas, requires large prop and scenery storage areas. Otherwise, the support areas can be fairly simple. The most important

1.24 STUDIO SET
A set provides a specific environment in which the performers or actors can move about. Some sets simulate real environments such as a café or a living room; others provide suitable workspace for a specific type of show. The furniture in this set is part of the set properties.

part of any storage area is its retrieval efficiency. If you must search for hours to find the props to decorate your office set, even the most extensive prop collection is worth very little. Clearly label all storage areas, and always put the props and scenery back in their designated places.

MAKEUP AND DRESSING ROOMS

These support areas are commonplace in large production centers where soap operas or other daily series programs are produced. In smaller production centers, makeup and dressing are done wherever it's convenient. The closer they are to the studio, the better it is for the talent.

MAIN POINTS

- Telecasts can originate almost anywhere, but the television studio affords maximum production control.
- The studio has three major production centers: the studio itself, the studio control room and master control, and the studio support areas.
- Important aspects of the physical layout of the studio are a smooth, level floor; adequate ceiling height; acoustic treatment and air-conditioning; and large, soundproof doors.
- Major installations include intercom systems, studio video and audio monitors, various wall outlets, and the lighting patchboard.
- The studio control room houses the program control with the various preview monitors, program speakers, intercoms, and clocks; the switcher; the audio control with the audio console, patchbay, program speakers, and audiotape recorders and other read/write digital devices; sometimes the lighting control board through which the intensity of the studio lights is regulated; and often the video control, which allows the video operator to achieve optimal pictures.
- Master control is the nerve center of a television station. It has facilities for program input, storage, and retrieval. It also checks the technical quality of all the programs that are broadcast.
- Program input is from such diverse sources as a station's own studios, via satellite or other remote feeds, or in the form of videotape. Program storage includes a unique house number for each program segment for fast identification and retrieval. Program retrieval is coordinated by the log, a second-by-second list of every program aired on a particular day.
- The studio support areas include space for property and scenery storage, as well as makeup and dressing rooms.

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