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Television Production Handbook

ELEVENTH EDITION



Zettl

**Television Production Handbook,
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Herbert Zettl**

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C H A P T E R

1

The Television Production Process

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When watching television, somebody's vacation videos, a blogger's video podcast, or even a movie, you probably feel that you could do just as well or even better than what's on the screen. This may be true, but it is more likely that you will be surprised to find how difficult it is to match the high production values of the average television show, even if the content begs for improvement. The automatic features of most equipment may even fool you into believing that television production is relatively easy—until your luck runs out. Even if your short vacation video looks pretty good to you, it may need much more effort and production skills to make it look good to somebody else. A seemingly simple 55-second chat between a news anchor in Portland and a soccer star in Madrid presents a formidable challenge even for experienced production personnel. This book will help you meet such a challenge.

The digital era has brought a general convergence of digital video and the necessary production processes, regardless of whether you are working in broadcast television, in digital cinema, or independently on small video projects. Fortunately, this convergence has a common base: multicamera and single-camera television production. Learning the ins and the outs of television production allows you to readily adapt to other forms of digital video production.

The major problem with learning television production is that to understand the function of one piece of equipment or production phase, you should already know all the others. Chapter 1 is designed to help you with this chicken-and-egg problem. It provides you with an overview of the initial production process, the people involved in small and large productions, and the necessary tools to generate the screen images and sound—the standard television equipment. Later chapters provide more detailed descriptions and explanations of equipment and production processes.

Section 1.1, What Television Production Is All About, walks you through the three phases of production, demonstrates a useful production model, and introduces you to the major nontechnical and technical production personnel.

Section 1.2, Technical Production Systems, introduces you to the basic, expanded, and field production television systems and their major production equipment.

KEY TERMS

effect-to-cause model Moving from idea to desired effect on the viewer, then backing up to the specific medium requirements to produce such an effect.

EFP Stands for *electronic field production*. Television production outside of the studio that is normally shot for postproduction (not live). Part of field production.

ENG Stands for *electronic news gathering*. The use of portable camcorders or cameras with separate portable video recorders, lights, and sound equipment for the production of daily news stories. ENG is usually not planned in advance and is often transmitted live or immediately after postproduction editing.

linear editing Analog or digital editing that uses tape-based systems. The selection of shots is nonrandom.

medium requirements All content elements, production elements, and people needed to generate the defined process message.

news production personnel People assigned exclusively to the production of news, documentaries, and special events.

nonlinear editing (NLE) Allows instant random access to shots and sequences and easy rearrangement. The video and audio information is stored in digital form on computer hard drives or other digital recording media.

nontechnical production personnel People concerned primarily with nontechnical production matters that lead from the basic idea to the final screen image.

postproduction Any production activity that occurs after the production. Usually refers to either video editing or audio sweetening (a variety of quality adjustments of recorded sound).

preproduction The preparation of all production details.

process message The message actually perceived by the viewer in the process of watching a television program. The program objective is the defined process message.

production The actual activities in which an event is recorded and/or televised.

technical personnel People who operate and maintain the technical equipment.

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, which convert pictures and sound into electrical signals, and a television set and a loudspeaker, which convert the signals back into pictures and sound.

SECTION

1.1

What Television Production Is All About

As a painter it is relatively easy to get your idea onto the canvas. All you need is something to paint on, some paints, a brush, and, of course, a little technique. You are the only one involved in the translation process from idea to image. Such a translation process for even a simple television production, however, is considerably more complex. You are seldom alone in the production process, face strict deadlines, and are always forced to work with a variety of complex equipment. This section gives a brief overview of the three phases of production—preproduction, production, and postproduction—suggests a production model that will streamline the use of people and equipment, and charts the major nontechnical and technical personnel. **ZVL1** PROCESS→ Process introduction

▶ THREE PRODUCTION PHASES

Preproduction, production, and postproduction

▶ PRODUCTION MODEL

Effect-to-cause model, medium requirements, and process message shaping medium requirements

▶ PRODUCTION PEOPLE

Nontechnical production personnel, technical production personnel, and news production personnel

■ THREE PRODUCTION PHASES

Regardless of whether you are part of the nontechnical or technical personnel, or whether you work with a big production team or all by yourself, you will inevitably be involved in one or all of the three production phases: preproduction, production, and postproduction.

Preproduction

Preproduction includes all the preparations and activities before you actually move into the studio or the field on the first day of production. It usually happens in two stages. Stage 1 consists of all the activities necessary to transform the basic idea into a workable concept or script. In stage 2 all the necessary production details, such as location, crews, and equipment for a single-camera or multicamera production, are worked out.

Production

As soon as you open the studio doors for rehearsal or a video-recording session, or load a camcorder into the van for a field shoot, you are in **production**. Except for rehearsals, production involves equipment and normally a crew—people who operate the equipment. It includes all activities in which an event is video-recorded or televised.

Postproduction

The major activity of **postproduction** consists of video and audio editing. It may also include color correction of video clips (so that the red shirt of an actor looks the same from one shot to the next), the selection of appropriate background music, and the creation of special audio effects. When using a single camera film-style, which means that a scene is built by recording one shot after another with only one camera, the postproduction activities may take longer than the actual production. **ZVL2** PROCESS→ Phases→ preproduction | production | postproduction

■ PRODUCTION MODEL

Like any other model, a production model is meant to help you move from the original idea to the finished production as efficiently as possible. It is designed to help you decide on the most effective approach the first time around, evaluate each major production step, and finish on time. Its function is similar to that of a road map: you don't have to follow it to get from here to there, but it makes finding your way much easier. If you feel that it is restrictive and cramps your creativity or style, don't use it.

Effect-to-cause Model

Like most other production models, the **effect-to-cause model** starts with a basic idea, but instead of moving from the basic idea directly to the production process, it jumps to the desired communication effect on the target

audience—the general program objective. This program objective can be reached through a specific message that, ideally, the viewer will actually receive, internalize, or act on. Because this all-important message is generated by the process of the viewer's watching the video and audio content of your television program and attaching meaning to it, we call it the **process message**. This process requires that you as a producer have a fairly clear idea of what you want the target audience to learn, do, and feel before you think about the necessary technical requirements. The model suggests that you move from the general idea directly to the desired effect and then back up and think about how to bring about—cause—this effect. **ZVL3** PROCESS → Effect-to-cause → basic idea | desired effect | cause | actual effect

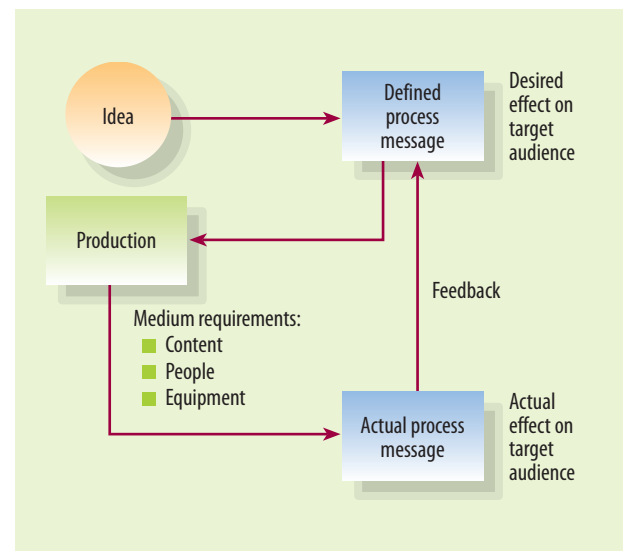
The more the actual process message (viewer effect) matches the defined one, the more successful the communication. **SEE 1.1**

Defined process message Rather than being driven by the initial idea, the production process is now driven by the defined process message—the desired effect on the target audience. At this point you could proceed to the **medium requirements**—the people, facilities, and equipment necessary for the preproduction, production, and postproduction phases. To further streamline the production process, you should find a useful angle.

Angle As you undoubtedly know, the angle is a specific story focus, a point of view from which to look at and describe an event. It can lead to an obvious bias of who tells the story, or it can be subtler and make a story more interesting to watch.

If a dog bites the letter carrier, the dog owner's story angle might be the rising crime in the neighborhood and the dog's attempt to protect his master. The letter carrier, on the other hand, may have quite a different view of the same event. He may well focus on the viciousness of the neighborhood dogs and the need for stricter leash laws. Both angles contain a strong and unacceptable bias.

You can also use an angle that gives the story a specific approach without introducing a strong bias. For example, you could document a popular singing star by watching her give a concert for a large enthusiastic audience or by observing her during a studio recording session. The first version would be a more public “looking-at” point of view, the second a more private “looking-into” point of view. This would change not only what equipment you need



1.1 EFFECT-TO-CAUSE PRODUCTION MODEL

The effect-to-cause production model jumps from the initial idea and story angle directly to the desired effect—the process message. It then backs up to the medium requirements that suggest the production elements and processes necessary to produce the defined process message.

(a multicamera setup with live switching or extensive postproduction for the first version) but also your shooting style (many more close-ups for version 2 than for version 1).

Medium Requirements

The advantage of this model is that the precise definition of the process message and a specific angle will help the content and production people work as a team and facilitate selecting the necessary production personnel and equipment. By first carefully defining the desired effect on the audience, you can then decide quite easily on the specific people you need to do the job (content expert, writer, director, and crew), on where to do the production most effectively (studio or field), and on the necessary equipment (studio or field cameras, types of mics, and so forth).

Process Message Shaping Medium Requirements

Let's assume that you are to produce a 15-minute segment of a live morning show. You are told by the show's executive producer to get a lawyer who is willing to talk about an ongoing high-profile murder trial.

The usual and intuitive way to approach this assignment would be to contact a well-known criminal lawyer and have the art director design a set that looks like a well-to-do lawyer's office, with an elegant desk, leather chairs, and lots of law books in the background. You would then have to arrange for the recording date, studio time, transportation for the guest, talent fees, and other such details.

When using the effect-to-cause model, on the other hand, you might come up with two different angles: one that shows the intellectual brilliance of a defense lawyer and her skill to engender reasonable doubt in the jurors, and another that reveals the emotional makeup and the inner conflict of a lawyer defending a suspect despite the overwhelming evidence that he is guilty.

Here's how the two different angles might influence the resulting process messages, and, in turn, dictate different production approaches:

Process message 1: *The viewer should gain insight into some of the major defense strategies used by the guest.*

In this case, the questions would revolve around some of the lawyer's former cases and the reasons for their success or failure. Would you need an interviewer who understands the law? Yes. The interviewer could interpret the legal language for the audience or immediately challenge the lawyer's ethics within the framework of the law. The elaborate studio set resembling the lawyer's office would also be appropriate. You may even consider conducting this interview on-location in the lawyer's actual office.

Process message 2: *The viewer should gain deeper insight into the conscience and the feelings of the lawyer when handling an especially difficult case as well as how she deals with personal ethics when applying specific defense strategies.*

Do you now need a host who is a legal expert? Not at all. In fact, a psychologist would probably be better suited to conduct this interview. You might opt for close-ups of the lawyer throughout most of the show. You may even stay on a close-up of the guest when the host asks questions. Reaction shots (the lawyer listening to questions) are often more telling than action shots (the lawyer answering). Does this interview require an elaborate set? No. Because the interview deals primarily with the lawyer as a person rather than the person as a lawyer, you can conduct it in any environment. Two comfortable chairs on an interview set are all you would need.

Some unsolicited advice: There has been a great reluctance in television production to show “talking

heads”—people talking on close-ups without any supporting visual material, special effects, or a constant dribble of background music. Do not blindly adopt this prejudice. So long as the heads talk well, there is no need for additional visual or aural clutter. **ZVL4** PROCESS → Effect-to-cause → basic idea | desired effect | cause

As you can see, in this case the angle was not stated separately but rather embedded in the defined process message. But would you need a process message if you were to write a play? Of course not. Even a nicely formulated process message would not help you write a more effective drama. Any dramatic presentation has its own internal structure that does not benefit from stating its desired effect on the audience. It is more important to think about character development and conflict than defining whether you want the audience to cry or laugh. More goal-directed program forms, however, such as instructional shows, interviews, documentaries, and certainly advertising, can benefit greatly from a precisely stated process message.

■ PRODUCTION PEOPLE

Even the most sophisticated television production equipment and computer interfaces will not replace *you* in the television production process; you and those working with you still reign supreme—at least so far. The equipment cannot make ethical and aesthetic judgments for you; it cannot tell you exactly which part of the event to select and how to present it for optimal communication. You make such decisions within the context of the general communication intent and through interaction with other members of the production team—the production staff, technical crews, engineers, and administrative personnel. You may soon discover that the major task of television production is working not so much with equipment as with people. In general, we can divide the production personnel into nontechnical personnel and technical personnel. Because news departments work independently of the regular production personnel, we list them separately.

Nontechnical Production Personnel

The **nontechnical production personnel** are generally involved in translating a script or an event into effective television images. They are also called above-the-line personnel because they fall under a different budget category from the technical crew, who are called below-the-line personnel. The above- and below-the-line distinction is anything but absolute or even uniform, however, and it changes depending on the crewmembers' union affiliations

and the budgetary practices of the production company. We therefore use here the more self-evident division of nontechnical and technical personnel. Figure 1.2 shows the principal functions of the major nontechnical production personnel. **SEE 1.2**

You should realize, however, that in smaller television operations one person might carry out several different functions. For example, the producer may also write and

direct the show, and the floor manager may take on the responsibilities of the line producer. You may find an AD (associate director) in the production of soap operas or a digital movie but rarely during most routine television shows. The art director may also function as a graphic artist, and most medium-sized or smaller production companies have little use for a permanent costume designer, wardrobe person, property manager, or sound designer.

1.2 NONTECHNICAL PRODUCTION PERSONNEL

PERSONNEL	FUNCTION
NONTECHNICAL PRODUCTION PERSONNEL	
Executive producer	In charge of one or several large productions or program series. Manages budget and coordinates with client, station management, advertising agencies, financial supporters, and talent and writers' agents.
Producer	In charge of an individual production. Responsible for all personnel working on the production and for coordinating technical and nontechnical production elements. Often serves as writer and occasionally as director.
Associate producer (AP)	Assists producer in all production matters. Often does the actual coordinating jobs, such as telephoning talent and confirming schedules.
Line producer	Supervises daily production activities on the set.
Field producer	Assists producer by taking charge of remote operations (away from the studio). At small stations function may be part of producer's responsibilities.
Production manager	Schedules equipment and personnel for all studio and field productions. Also called <i>director of broadcast operations</i> .
Production assistant (PA)	Assists producer and director during actual production. During rehearsal takes notes of producer's and/or director's suggestions for show improvement.
Director	In charge of directing talent and technical operations. Is ultimately responsible for transforming a script into effective video and audio messages. At small stations may often be the producer as well.
Associate director (AD)	Assists director during the actual production. In studio productions does timing for director. In complicated productions helps "ready" various operations (such as presetting specific camera shots or calling for a video recorder to start). Also called <i>assistant director</i> .
Floor manager	In charge of all activities on the studio floor. Coordinates talent, relays director's cues to talent, and supervises floor personnel. Except for large operations, is responsible for setting up scenery and dressing the set. Also called <i>floor director</i> and <i>stage manager</i> .
Floor persons	Set up and dress sets. Operate cue cards and other prompting devices, easel cards, and on-camera graphics. Sometimes help set up and work portable field lighting instruments and microphone booms. Assist camera operators in moving camera dollies and pulling camera cables. At small stations also act as wardrobe and makeup people. Also called <i>grips</i> , <i>stagehands</i> , and <i>utilities personnel</i> .

1.2 NONTECHNICAL PRODUCTION PERSONNEL (continued)

PERSONNEL	FUNCTION
ADDITIONAL PRODUCTION PERSONNEL	
<i>In small operations these production people are not always part of the permanent staff or their functions are fulfilled by other personnel.</i>	
Writer	At smaller stations and in corporate television, the scripts are often written by the director or producer. Usually hired on a freelance basis.
Art director	In charge of the creative design aspects of show (set design, location, and/or graphics).
Graphic artist	Prepares computer graphics, titles, charts, and electronic backgrounds.
Makeup artist	Does the makeup for all talent. Usually hired on a freelance basis.
Costume designer	Designs and sometimes even constructs various costumes for dramas, dance numbers, and children's shows. Usually hired on a freelance basis.
Wardrobe person	Handles all wardrobe matters during production.
Property manager	Maintains and manages use of various set and hand properties. Found in large operations only. Otherwise, props are managed by the floor manager.
Sound designer	Constructs the complete sound track (dialogue and sound effects) in postproduction. Usually hired on a freelance basis for large productions.

Television talent—the performers and actors who work in front of the camera—are usually considered part of the nontechnical production personnel (discussed in chapter 16). **ZVL5** PROCESS → People → nontechnical

Technical Personnel and Crew

The *technical personnel* consist of people who are primarily concerned with operating equipment. They are usually part of the crew. The technical personnel include camera operators, audio and lighting people, video recorder (VR) operators, video editors, C.G. (character generator) operators, and people who set up communication and signal transmission equipment. The term *technical* does not refer to electronic expertise but rather to operating the equipment with skill and confidence. The true engineers, who understand electronics and know where to look when something goes wrong with a piece of equipment, usually do not operate equipment; rather they ensure that the whole system runs smoothly, supervise its installation, and maintain it. You may find that in larger professional operations, however, the technical production people are

still called engineers, mainly to satisfy the traditional job classification established by the labor unions.

The DP (director of photography) is sometimes listed as part of the nontechnical personnel and sometimes as part of the technical team. The term, borrowed from film production, has found its way into television. In standard theatrical film production, the DP is mainly responsible for lighting and the proper exposure of the film rather than for running the camera. In smaller digital film productions and EFP (electronic field production), the DP operates the camera as well as does the lighting. So when you hear that an independent television producer/director is looking for a reliable and creative DP, he or she is primarily referring to an experienced EFP camera operator.

SEE 1.3 **ZVL6** PROCESS → People → technical

As mentioned, many of the functions of technical and nontechnical production people overlap and even change, depending on the size, location, and relative complexity of the production. For example, you may initially have acted as a producer when setting up the video recording of the semiannual address of a corporation president;

1.3 TECHNICAL PERSONNEL

PERSONNEL	FUNCTION
ENGINEERING STAFF	
<i>These people are actual engineers who are responsible for the purchase, installation, proper functioning, and maintenance of all technical equipment.</i>	
Chief engineer	In charge of all technical personnel, budgets, and equipment. Designs system, including transmission facilities, and oversees installations and day-to-day operations.
Assistant chief engineer	Assists chief engineer in all technical matters and operations. Also called <i>engineering supervisor</i> .
Studio or remote engineer-in-charge	Oversees all technical operations. Usually called <i>EIC</i> .
Maintenance engineer	Maintains all technical equipment and troubleshoots during productions.
NONENGINEERING TECHNICAL PERSONNEL	
<i>Although skilled in technical aspects, the following technical personnel do not have to be engineers but usually consist of technically trained production people.</i>	
Technical director (TD)	Does the switching and usually acts as technical crew chief.
Camera operators	Operate the cameras; often do the lighting for simple shows. When working primarily in field productions (ENG/EFP), they are sometimes called <i>videographers</i> and <i>shooters</i> .
Director of photography (DP)	In film productions, in charge of lighting. In EFP, operates EFP camera.
Lighting director (LD)	In charge of lighting; normally found mostly in large productions.
Video operator (VO)	Adjusts camera controls for optimal camera pictures (shading). Sometimes takes on additional technical duties, especially during field productions and remotes. Also called <i>shader</i> .
Audio technician	In charge of all audio operations. Works audio console during the show. Also called <i>audio engineer</i> .
Video-record operator	Runs the video recorder.
Character generator (C.G.) operator	Types and/or recalls from the computer the names and other graphic material to be integrated with the video image.
Video editor	Operates postproduction editing equipment. Often makes or assists in creative editing decisions.
Digital graphic artist	Renders digital graphics for on-air use. Can be nontechnical personnel.

then, on the day of the shoot, you may find yourself busy with such technical matters as lighting and running the camera. In larger productions, such as soap operas, your job responsibility is much more limited. When acting as a producer, you have nothing to do with lighting or equipment operation. When working the camera, you may have to wait patiently for the lighting crew to finish, even if the production is behind schedule and you have nothing else to do at the time.

NEWS PRODUCTION PERSONNEL

Almost all television broadcast stations produce at least one daily newscast; in fact, the newscasts are often the major production activity at these stations. Because news departments must be able to respond quickly to a variety of production tasks, such as covering a downtown fire or a protest at city hall, there is generally little time to prepare for such events. News departments therefore have their own *news production personnel*. These people are

dedicated exclusively to the production of news, documentaries, and special events and perform highly specific functions. **SEE 1.4**

Don't be puzzled if you hear the assignment editor of a news department sending several VJs to cover breaking stories. *VJ* stands for *video journalist*—an individual who must combine the functions of reporter, videographer, writer, and editor. This rather demanding job was obviously not instituted to improve news coverage but to save money. Nevertheless it's apparent that you can no longer afford a narrowly focused training but must be fluent in all aspects of television production.

As in any other organization, television and corporate video involve many more people than what you see listed in this section, such as clerical personnel and the people who answer phones, schedule events, sell commercial time, negotiate contracts, build and paint the sets, and clean the building. Because these support personnel operate outside of the basic production system, their functions aren't discussed here.

1.4 NEWS PRODUCTION PERSONNEL

PERSONNEL	FUNCTION
News director	In charge of all news operations. Bears ultimate responsibility for all newscasts.
Producer	Directly responsible for the selection and the placement of the stories in a newscast so that they form a unified, balanced whole.
Assignment editor	Assigns reporters and videographers to specific events to be covered.
Reporter	Gathers the stories. Often reports on-camera from the field.
Video journalist	Reporter who shoots and edits his or her own footage.
Videographer	Camcorder operator. In the absence of a reporter, decides on what part of the event to cover. Also called <i>news photographer</i> and <i>shooter</i> .
Writer	Writes on-the-air copy for the anchors. The copy is based on the reporter's notes and the available video.
Video editor	Edits video according to reporter's notes, writer's script, or producer's instructions.
Anchor	Principal presenter of newscast, normally from a studio set.
Weathercaster	On-camera talent, reporting the weather.
Traffic reporter	On-camera talent, reporting local traffic conditions.
Sportscaster	On-camera talent, giving sports news and commentary.

MAIN POINTS

- ▶ The three production phases are preproduction, production, and postproduction.
- ▶ Preproduction includes the preparation of a show before the actual production activities take place. It usually happens in two stages: the first is the move from the basic idea to the script; the second is the designation of the necessary equipment (cameras, microphones, and so forth), facilities (studio or field production), and people to transform the script into a television show.
- ▶ Production includes all the activities in which equipment and the crew operating it create the actual program or program segments. The program can be video-recorded or put on the air; the segments are usually video-recorded for postproduction.
- ▶ Postproduction involves mostly video and audio editing. The various program sections that were recorded in the production phase are put into the proper sequence. It can also include the enhancement of the pictures and the sound.
- ▶ The effect-to-cause model facilitates the production approach. It moves from the basic idea to the process message (the desired effect on the viewer) and from there to the medium requirements (content, people, and equipment) necessary to actually cause the process message. The closer the defined and actual process messages match, the more successful the program.
- ▶ The nontechnical production personnel include a variety of people who design the program (writers, art director, sound designer, and so forth) and execute the program (producers, director, floor manager, and assistants).
- ▶ The technical personnel include the engineers, who install and maintain the equipment, and the nonengineering technical personnel, who operate the equipment.
- ▶ The news department has its own production personnel, who consist of a variety of producers, writers, assignment editors, graphic artists, reporters, and videographers as well as video journalists, who report, operate the camera, and write and edit the story.

SECTION

1.2

Technical Production Systems

To make sense of the various pieces of television equipment and how they interact in a multicamera or single-camera production, you should consider them as part of a system. This way you can relate how they function together, even though they are presented here individually. This section gives an overview of the studio and field production systems and an introduction to the major equipment.

▶ BASIC TELEVISION SYSTEM

How a program host appears on the television receiver

▶ EXPANDED TELEVISION SYSTEM

Multicamera studio system

▶ FIELD PRODUCTION SYSTEMS

ENG (electronic news gathering) and EFP (electronic field production) systems

▶ MAJOR EQUIPMENT

Camera, audio, lighting, switcher, video recorder, and postproduction editing

■ BASIC TELEVISION SYSTEM

A system is a collection of elements that work together to achieve a specific purpose. Each element depends on the proper functioning of 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.

How a Program Host Appears on the Television Receiver

Whether the production is simple or elaborate or originates in the studio or in the field—that is, on-location—the television 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 (electric energy). **SEE 1.5** The picture signals are called video signals, and the sound signals are called audio signals. Any small consumer camcorder represents such a system.

■ EXPANDED TELEVISION SYSTEM

The expanded system includes more equipment in a variety of configurations. Productions such as news, interviews, game shows, and soap operas use the multicamera studio system.

Multicamera Studio System

The multicamera studio system in its most elementary stage includes two or more cameras, camera control units (CCUs), preview monitors, a switcher, a line monitor, one or more video recorders, and a line-out that transports the video signal to the video recorder and/or the transmission device. **SEE 1.6**

Usually integrated into the expanded system are computer servers or videotape machines for playback, character or graphic generators that produce various forms of lettering or graphic art, and an editing system.

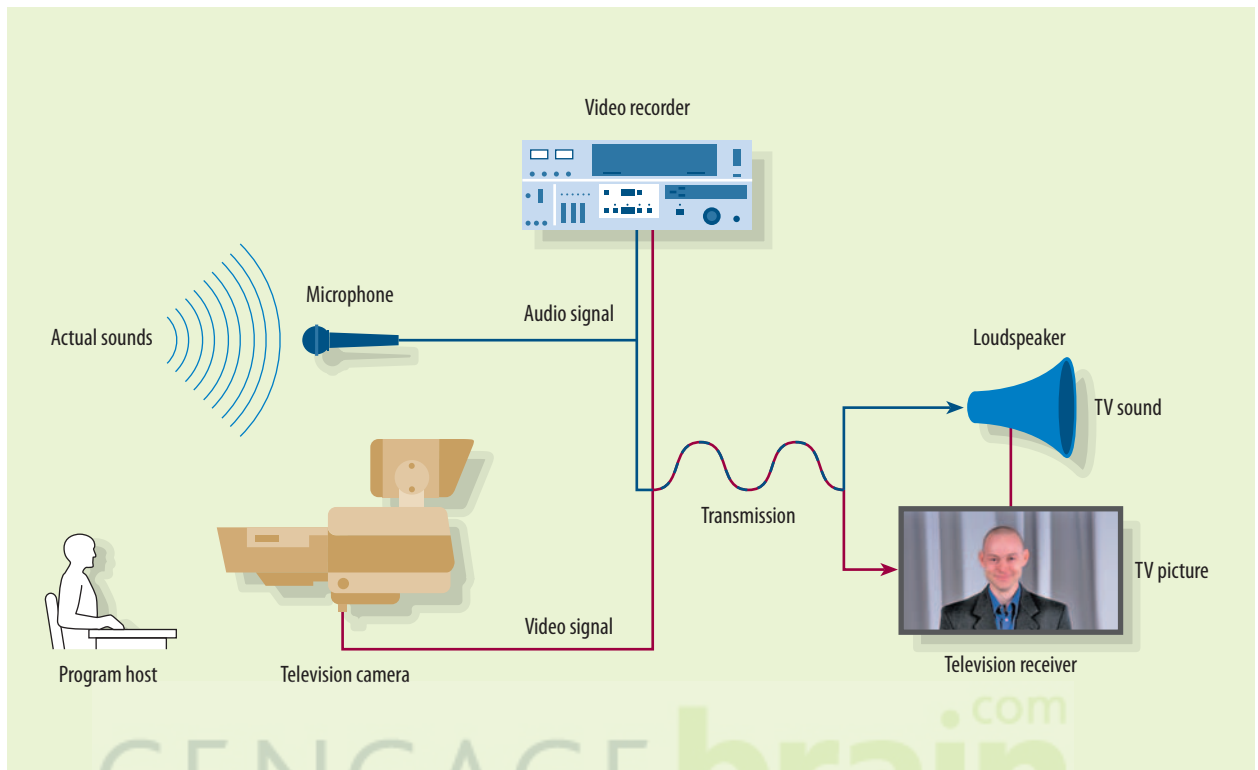
The audio portion of the expanded system consists of one or more microphones, an audio mixer or console, an audio monitor (speaker), and a line-out that transports the sound signal to the video recorder and/or the transmitter (see figure 1.6).

■ FIELD PRODUCTION SYSTEMS

Except for big-remote telecasts that are used for the transmission of live sports or special events, the field production systems are much less complex than even a simple studio show. These field productions usually consist of **ENG** (electronic news gathering) or the more elaborate **EFP** (electronic field production).

ENG System

Electronic news gathering is usually done with a camcorder, which houses an entire video system in an amazingly



1.5 PHOTO BY EDWARD A. OMA

1.5 BASIC TELEVISION SYSTEM

The basic television system converts light and sounds into electrical video and audio signals that are transmitted (wirelessly or by cable) and reconverted by the television receiver and loudspeaker into television pictures and sound.

small box. It contains all the elements needed to capture and record an event. The expanded system uses a second microphone in addition to the built-in one and may use a small transmitter that routes the signal to the television station or an ENG van. **SEE 1.7**

EFP System

The EFP system normally consists of a single portable EFP camera and an external recording device or camcorder to record various segments of an event for postproduction editing. In more elaborate productions, several cameras or camcorders are used simultaneously to capture an event from various viewpoints. **SEE 1.8**

MAJOR EQUIPMENT

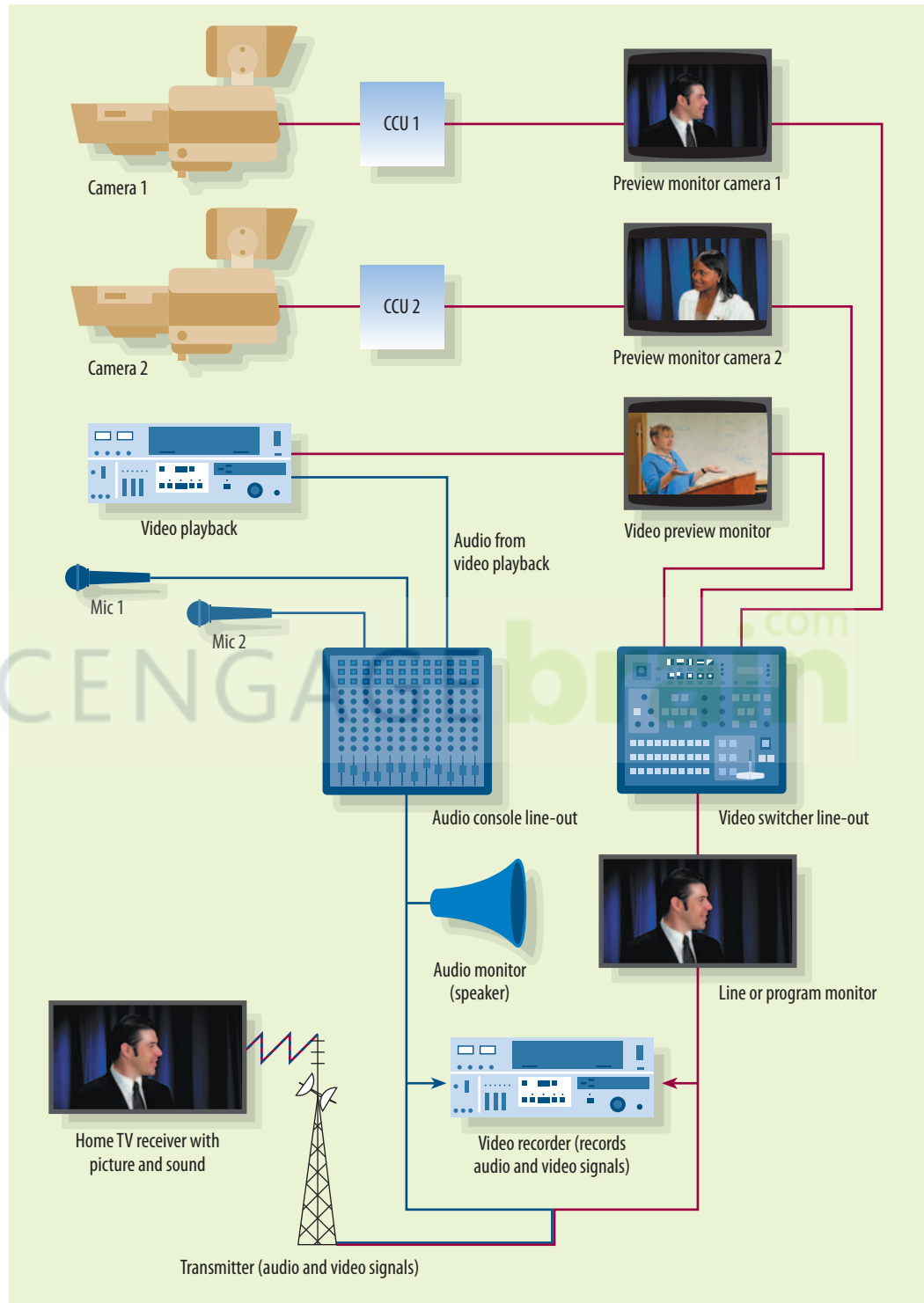
With the expanded television system in mind, we briefly explore six basic production elements: camera, audio, lighting, switcher, video recorder, and postproduction editing. When learning about television production equipment,

always try to see each piece and its operation within the larger context of the television system, that is, in relation to all the other equipment. Then tie the equipment to the people who operate it—the technical personnel. It is, after all, the skilled and prudent use of the television equipment by the whole production team, and not simply the smooth interaction of the machines, that gives the system its value.

Camera

The most obvious production element—the camera—comes in all sizes and configurations. Some cameras are so small that they fit easily into a coat pocket; 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 1.9**

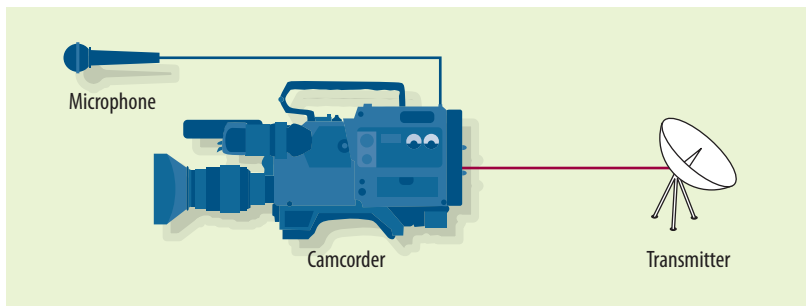
ENG/EFP camcorders are portable cameras that use a variety of recording media—videotape, hard drives, optical discs, and memory cards (also called flash drives). They operate much like consumer models except that they have



1-6 PHOTOS BY EDWARD AIONA

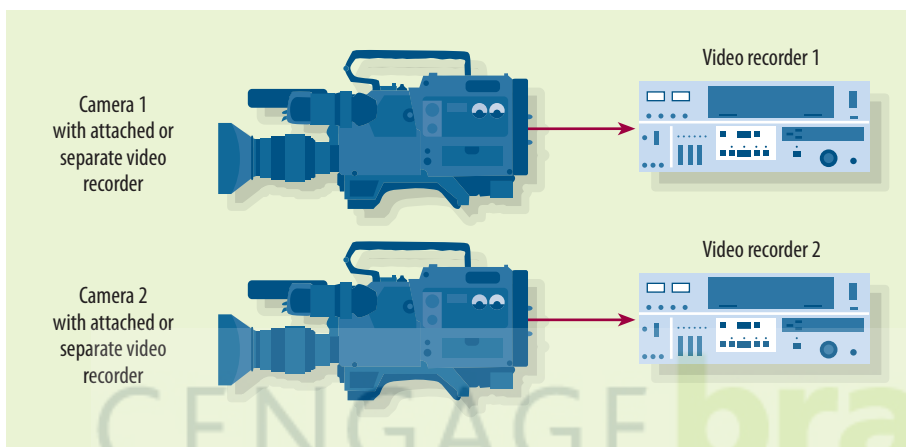
1.6 MULTICAMERA STUDIO SYSTEM

The multicamera studio system contains quality controls (CCU and audio console), selection controls (switcher and audio console), and monitors for previewing pictures and sound.



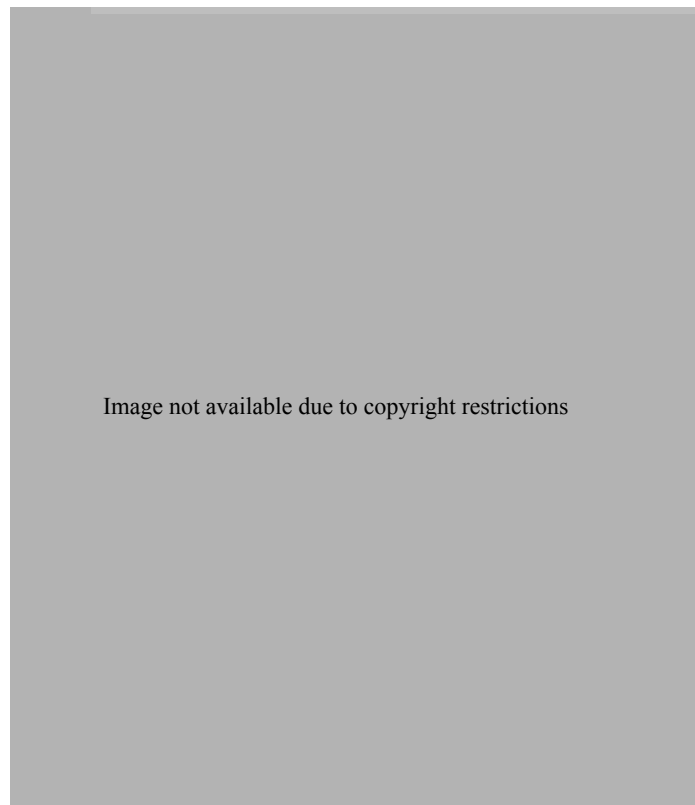
1.7 ENG SYSTEM

The 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 capabilities. A portable transmitter is necessary to send a live field pickup to the studio.



1.8 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 video recorders.





1.10 SMALL HDV CAMCORDER

This high-definition video camcorder delivers video that comes close to that of the much more expensive HDTV camcorders. It records on MiniDV cassette tapes.

better lenses (which can be exchanged), better imaging devices (which transduce the light coming from the lens into video signals), and more controls that help produce optimal pictures even under less-than-ideal conditions. In fact, some of the new HDTV (high-definition television) camcorders are simply upgrades of high-end consumer models. **SEE 1.10**

Many high-end ENG/EFP camcorders use tapeless recording devices, which store pictures and sound on hard drives, optical discs, or memory cards. The advantages of such tapeless recording media are that they have no moving parts and they can be directly transferred into a digital editing system. **SEE 1.11** **ZVL7** CAMERA → Camera introduction
ZVL8 CAMERA → Camera moves

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 of a crime show. The squealing tires during a high-speed chase are real enough, but the exciting, rhythmically fast background



1.11 HIGH-END PROFESSIONAL HDTV CAMCORDER

This high-end camcorder can record on a hard-drive field pack or a memory card. Both can be transferred directly to an HDTV nonlinear editing system.

music that accompanies the scene is definitely artificial. We have grown so accustomed to such devices, however, that we would probably perceive the scene as less exciting if the music were missing. In fact, some crime shows and commercials carry a continuous music track with a highly rhythmic beat even through the dialogue. Frequently, sound communicates the energy of an event more readily than pictures do.

Even if you don't intend to become a sound designer, you need to learn as much as possible about the major sound production elements: microphones, sound control equipment, and sound recording and playback devices. **ZVL9** AUDIO → Audio introduction

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.

Some microphones, called lavalier mics (pronounced “mikes”), are quite small and are clipped to the performer's clothing. Hand mics are larger and carried by the performer or attached to a mic stand. Boom, or long-distance, mics are either suspended from a small boom (called a fishpole, which is carried by the operator) or from a large boom, whose operator sits on a movable platform.

SEE 1.12 **ZVL10** AUDIO → Microphones → mic types



1.12 PHOTO BY EDWARD AIONA

1.12 FISHPOLE MICROPHONE

This highly directional shotgun mic is suspended from a fishpole by the boom operator.

Sound control equipment In studio productions the most important piece of sound control equipment is the audio console. At the audio console, you can select a specific microphone or other sound input, amplify a weak signal from a mic or other audio source for further processing, control the volume and the quality of the sound, and mix (combine) two or more incoming sound sources. In relatively simple productions, such as a newscast or an interview, you are mostly concerned with keeping the audio within a certain volume level. If it is too low, the viewer/listener can't hear the sound very well; if it is too high, the sound is not only hard on the ears but distorts so much that it may be impossible to fix in postproduction. **SEE 1.13**

In ENG and EFP, the sound 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. **SEE 1.14** **ZVL11** AUDIO → Consoles and mixers

Sound recording and playback devices When an event is recorded for postproduction, most of the dialogue and environmental sounds are recorded simultaneously with the picture.

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,



1.13 AUDIO CONSOLE

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



1.14 AUDIO MIXER

The portable mixer has a limited number of inputs and volume controls.

1.13 PHOTO COURTESY LOUD TECHNOLOGIES, INC.

1.14 PHOTO COURTESY SHURE, INC.

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, especially when the dialogue occurs outdoors. As you undoubtedly know and have probably experienced, wind is a constant hazard to clean sound pickup. **ZVL12** AUDIO → Systems

Lighting

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

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. In television and motion pictures, these lights are called spotlights. 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. Television and motion pictures use floodlights to achieve such a general nondirectional lighting. **ZVL13** LIGHTS → Light introduction

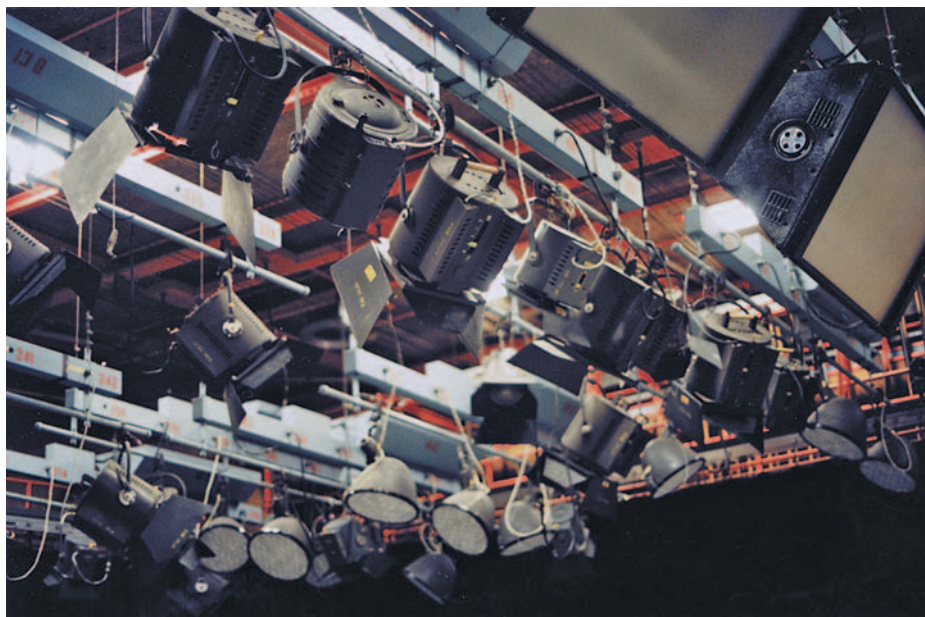
Lighting instruments In the television studio, the various types of spotlights and floodlights are usually suspended on battens that can be raised close to the ceiling and lowered close to the floor. This enables the lighting people to place the instruments in the desired positions on the battens. When the battens are raised, the cameras and crewmembers can move freely about the studio floor without interfering with the lighting. **SEE 1.15**

ENG and EFP use much smaller, portable instruments that can be set up quickly and plugged into ordinary household outlets. **ZVL14** LIGHTS → Instruments → studio | field

Lighting techniques As mentioned, lighting is the manipulation of light and shadows that influences the way we perceive how things on-screen look and feel. All television lighting is based on a simple principle: to illuminate specific areas, mold shadows, and bring the overall light on a scene to an intensity level at which the cameras can produce optimal pictures and create a certain mood. Optimal pictures means that the colors are faithfully reproduced even in the shadow areas, that there is a certain number of brightness steps between the darkest and the brightest spots in the scene, and that you can still see some detail in the brightest and darkest areas. For some shows the lighting is deliberately flat, which means that there is little contrast between light and shadows. Such lighting is frequently used on news and interview sets, for game shows and situation comedies, and in many field productions. Crime

1.15 STUDIO LIGHTS SUSPENDED FROM MOVABLE BATTENS

Typical studio lighting uses spotlights and floodlights. All instruments are suspended from battens that can be lowered close to the studio floor and raised well above the scenery.



1.15 PHOTO BY HERBERT ZETTL

and mystery shows often use high-contrast lighting. This creates dense shadows and intensifies the dramatic tension. **ZVL15** LIGHTS→ Falloff→ fast | slow | none

Switcher

The switcher works on a principle similar to that of push-buttons on a car radio, which allow you to choose different radio stations. The switcher lets you select various video inputs, such as cameras, video recorders, 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.

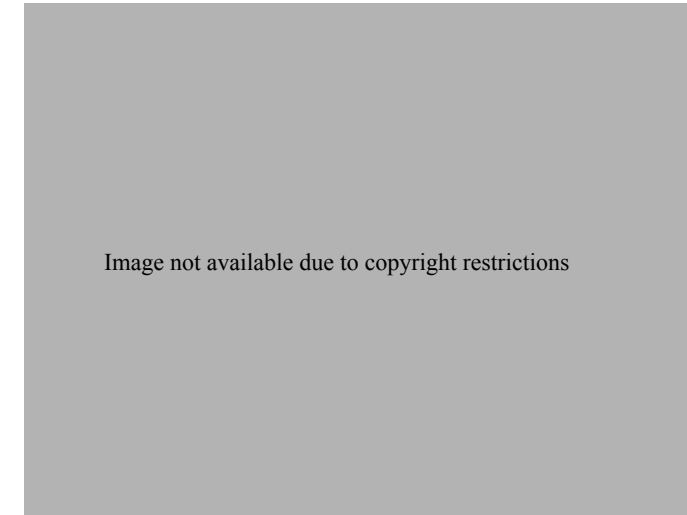
Any switcher, simple or complex, can perform three basic functions: select an appropriate video source from several inputs, perform basic transitions between two video sources, and create or retrieve special effects, such as split screens. **SEE 1.16**

If you now go back to figure 1.6, you can see that three video inputs—camera 1, camera 2, and a video recorder—are routed to the switcher. From these three inputs, camera 1 is selected to go on the air. **ZVL16** SWITCHING→ Switching introduction

Video Recorder

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. There are two basic recording systems: videotape recorders and tapeless recorders.

Videotape recorders Despite the great progress made almost daily to develop digital recording systems that are



more efficient than videotape, videotape recorders (VTRs) will still be in use for some time to come, so don't throw away your old VCR, videotape collection, or tape-based camcorder just yet. Videotape is still widely used in large and small camcorders, including high-end HDV (high-definition video) and HDTV systems. Note that you can use videotape for analog as well as digital recordings.

Videotape recorders are usually classified by the electronic system used for the recording (DVCPRO, S-VHS, or VHS) and sometimes by the tape format (the width of the videotape in the videocassette). Several VTR systems still use ½-inch videocassettes (digital Betacam SX, S-VHS, and VHS). Most digital systems use ¼-inch cassettes (6.35mm) for SDTV (standard digital television), HDV, or HDTV. They come in the standard smaller MiniDV cassettes as well as larger cassettes that allow for longer recording and playback. **SEE 1.17**



1.17 HDTV VIDEOTAPE RECORDER

This high-definition studio VTR can use a variety of cassettes (MiniDV and the larger formats) for recording and playback of high-definition footage, including digital cinema material.

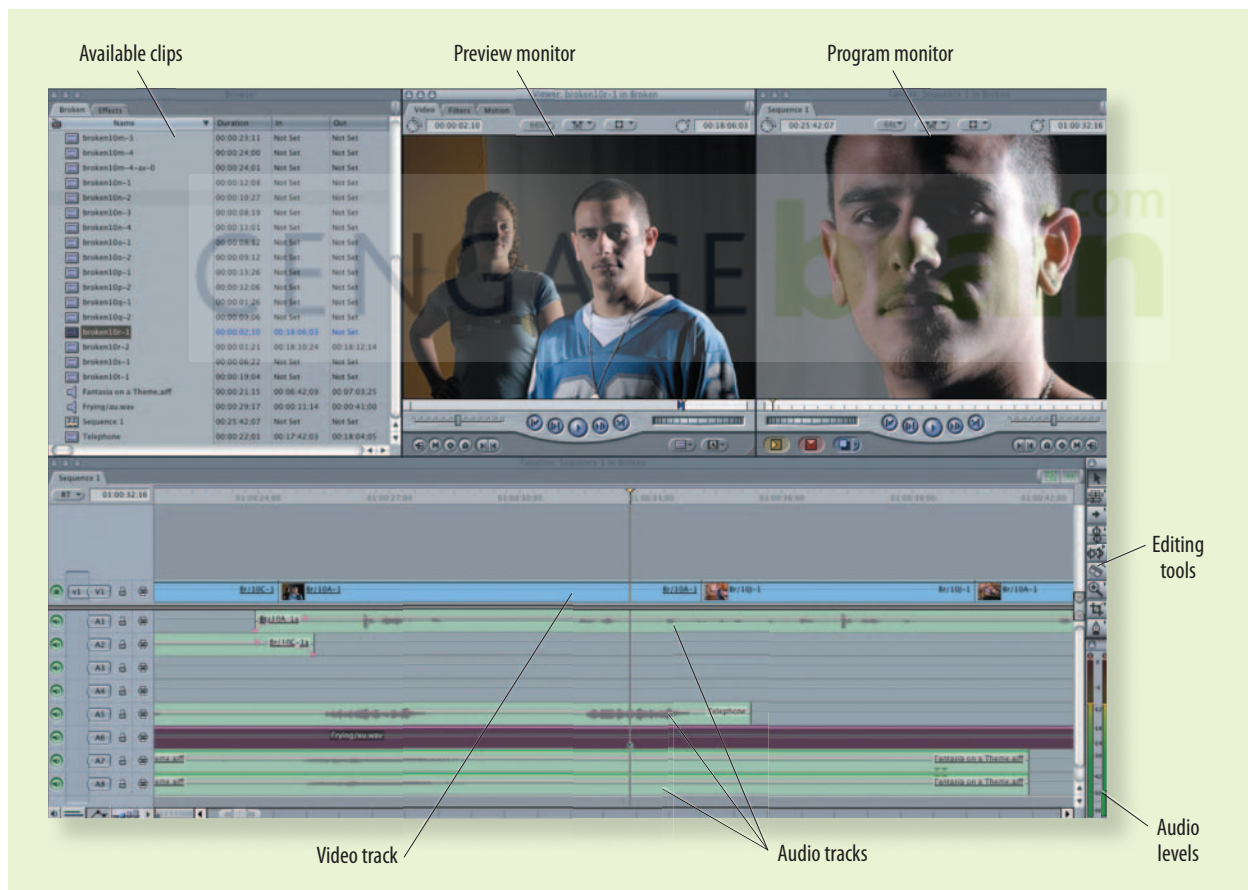
Tapeless systems Great and rapid progress is being made toward a tapeless environment wherein all video recording, storage, and playback is done with non-tape-based systems. Such tapeless systems make use of hard drives, optical discs, and memory cards.

High-capacity hard drives are used extensively for the storage, manipulation, and retrieval of video and audio information by desktop computers and dedicated editing systems (specially manufactured editors) for postproduction. Hard drives with a very large storage capacity (in the multi-terabyte range—a terabyte equals 1,000 gigabytes) are called servers and have all but replaced videotape for the storage and playback of daily programming in most television stations.

Postproduction Editing

In principle, postproduction editing is relatively simple: you select the most effective shots from the original source material and join them with transitions in a specific sequence. In practice, however, postproduction editing can be quite complicated and time-consuming, especially if it also involves extensive audio manipulation. **ZVL17** EDITING → Editing introduction

Nonlinear editing A *nonlinear editing (NLE)* system does not use videotape. Before editing can begin, all recorded material must first be transferred to the hard drive of an editing system, which can be a laptop, a desktop computer, or a workstation especially designed



1.18 NONLINEAR EDITING COMPUTER INTERFACE

The interface of most NLE systems shows a list of available clips, a preview monitor of the upcoming shot that is to be edited to the shot shown on the program monitor, a video track (blue track with thumbnail images), two or more audio tracks (green tracks), and other information such as available transitions.

for postproduction editing. Once all video and audio clips are on the hard drive of the editing system, you can manipulate them pretty much as you would edit text with a word-processing program. You can call up, move, cut, paste, and join the various shots or audio segments much like words, sentences, and paragraphs when editing a document. This method is called nonlinear because you can call up any clip or frame regardless of the sequence in which it was captured.

Almost all NLE software lets you produce high-resolution full-frame, full-motion video and audio sequences. You can also decide to first produce a low-resolution preliminary rough-cut, from which you develop an EDL (edit decision list). This list is then your guide for the final high-resolution edit master recording, which is used for program duplication or broadcast.

SEE 1.18 ZVL18 EDITING → Nonlinear editing → system

Linear editing Whenever you use digital or analog videotape for postproduction, you are engaged in linear editing. **Linear editing** normally requires two source VTRs, which contain the original material that you recorded with the camera, and the record VTR, which produces the final edit master tape.

All three machines are synchronized by the edit controller, also called an editing control unit. This unit helps you 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. **ZVL19** EDITING → Linear editing → system

Regardless of the editing system you use, it cannot make the creative decisions for you. Thinking about postproduction as early as the preproduction stage facilitates considerably your editing chores. Always consider postproduction an extension of the creative process, not a salvage operation.

MAIN POINTS

- ▶ The basic television system consists of the equipment and the people who operate the equipment to produce specific programs. In its simplest form, the system comprises 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 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) system consists basically of a camcorder and a microphone. The EFP (electronic field production) system may include multiple camcorders or field cameras, some lighting, and audio and video control equipment.
- ▶ The major production elements are the camera, audio, lighting, switcher, videotape recorder, and postproduction editing.
- ▶ There are several types of video cameras: large studio cameras that need a pedestal to be moved about the studio floor; ENG/EFP cameras that are small enough to be carried by the operator; and camcorders, which have the recording device either built into the camera or attached to it.
- ▶ Audio, the sound portion of a television show, is necessary to give specific information about what is said and to set the mood of a scene.
- ▶ Audio production elements include microphones, sound control equipment, and sound recording and playback devices.
- ▶ Lighting is the manipulation of light and shadows that influences the way we perceive objects on-screen and how we feel about the screen event.
- ▶ The two types of illumination are directional light, produced by spotlights, and diffused light, produced by floodlights.
- ▶ The switcher enables you to do instantaneous editing by selecting a specific picture from several inputs and performing basic transitions between two video sources.
- ▶ There are a variety of analog and digital tape-based recorders as well as digital tapeless video recorders.
- ▶ Non-tape-based systems include hard drives, optical discs, and memory cards or flash drives. Large-capacity hard-drive systems, called servers, are used for the recording, storage, and playback of program material.
- ▶ Postproduction editing consists of 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 hard drive and manipulated using computer software. Nonlinear editing (NLE) systems can produce high-quality video and audio sequences for broadcast or duplication, a rough-cut of lesser video quality, or an EDL (edit decision list), which serves as a guide for the final high-quality edit master.

ZETTL'S VIDEO LAB



For your reference or to track your work, the Zettl's VideoLab program cues in this chapter are listed here with their corresponding page numbers.

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- ZVL12** AUDIO→ Systems 18
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