PETER UTZ

VIDEO USER'S HANDBOOK

THIRD EDITION

THE COMPLETE ILLUSTRATED GUIDE TO OPERATING AND MAINTAINING YOUR VIDEO EQUIPMENT

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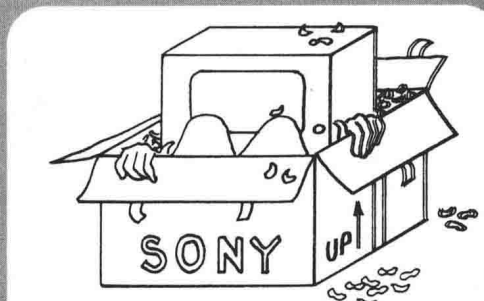
To Barbara, who tlyped the frist driftS oF THis manuscript.



Exciting things to come.

PREFACE

This book teaches you how to use various kinds of television equipment. It shows how to operate industrial TV cameras, video tape recorders, monitor/receivers, and other devices. It includes information on such skills as editing, sound, lighting, graphics, color, special effects, maintenance, purchasing, and creative production techniques and shortcuts.

Video User's Handbook differs from most other TV texts in the way it is written. First, it starts *very easy* and slowly progresses through fundamental skills before it forges into advanced and complicated TV work. *That makes this the kind of book you can rely on when there's nobody around to help you.* No prior knowledge is assumed. Everything (I hope) is included, no matter how elementary. Second, this TV manual *requires no electronic understanding whatsoever.* In addition, *no electronics is taught.* This book is written for the nonmechanically inclined and includes a minimum of technical language.

Video User's Handbook is of special interest to:

1. Media directors who contemplate their school's expansion into the area of television.
2. Media technicians who have acquired television as a new responsibility.
3. Industrial users, just beginning to use TV for instruction or employee development.
4. Training managers who desire to know how to use their own equipment rather than depending on their technicians.
5. Teachers who wish to develop instructional materials.
6. Veteran video directors and producers who need help training aides and assistants in equipment operation.
7. Security organizations using television for surveillance.
8. Librarians who deal with media, including television.
9. Amateurs and video experimenters who would like to learn video but are intimidated by the electronics taught in other video books.
10. Instructors using it as a classroom text in television journalism, media, or communications courses.

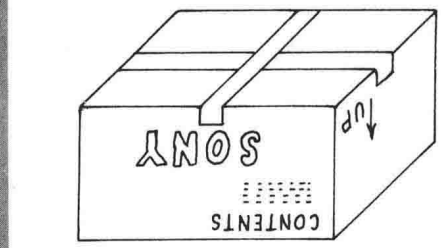
A word about TV courses. Traditionally, schools have taught TV studio production courses to prepare students for a career in TV broadcasting. Unfortunately, NBC is hardly in the market for novice TV directors. Jobs for traditional graduates are rarer than clean rest rooms in a bus terminal. Recent studies show that education, industry, and

cable TV are where the jobs are, and the people being sought are the "do-everything" types with hands-on, nuts-and-bolts experience. This book is designed for a hands-on, do-everything course of study. Its graduates should be able to buy TV equipment, hook it up, and make TV programs with it, asking very little help from outside experts. These are the graduates who will get the jobs.

This book is written for the person who wants to know only what he or she needs to know in order to operate TV equipment. It is a gentle first step into television, designed to leave the reader with the ability to *do* something after each chapter. The chapters are arranged according to the difficulty of the tasks to be performed. The easiest tasks are explained first and are followed by more difficult ones until, at the end of the chapter, all the simple steps add together to make one complicated (or so it seemed at the beginning) activity.

Although the masculine gender is generally used throughout this book, it is meant in the generic sense. There is no skill in television that a man can inherently perform better than a woman.

As you page through this book, you may notice that certain terms are printed in SMALL CAPITALS. The terms are printed differently in order to indicate that they are professional language worthy of remembering. Learn these terms. You will come across them again and again. Perhaps the special capitals will help you to remember them.



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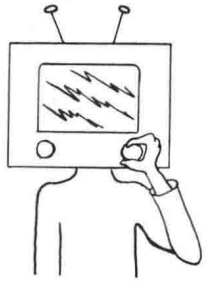

Getting the picture.

THE TV RECEIVER

In the preface, I promised to start with the easy tasks first, but then, who reads a preface? Since you may be quite familiar with TV receivers, you might wish to skim lightly through this chapter just checking to see that you're familiar with all the terms. And who knows, something you didn't know may pop out and surprise you!

The TV receiver is the most familiar piece of television equipment and the easiest to use, so we will deal with the receiver first. Since there are many kinds of TV receivers, the descriptions in this chapter may not fit your particular set exactly. Usually the difference will be in the labeling and/or location of the knobs and switches. When in doubt, read your TV's instruction manual (which I'll bet you can't find).

OPERATING A TV RECEIVER AFTER SOMEONE ELSE HAS SET IT UP

Say you enter a room and wish to use a TV receiver that you know was in use earlier. You first turn the set on, assuming you can find the knob. The knob you are looking for may be called: POWER, ON, ON/OFF, OFF, VOLUME, or it may have no markings at all. If you can't find the switch easily, try turning, pulling, or pushing a few. There are no external knobs on a TV receiver that, when maladjusted, can permanently harm the set, so go ahead and explore.

Now that you've switched the set on, you'd like to know if the set is really working. You can wait a minute for the TV to warm up and come on, or you can immediately tell that the set is on when: (1) the light illuminating the channel numbers comes on (most receivers except the small ones have channel selectors that light up), or (2) you hear a faint, high-pitched squeal that tells you the TV circuits are working. If your set has an instant-on feature, you will also get a picture immediately, but sets without this capacity require a warm-up period before the picture appears.

If you have waited about thirty seconds and nothing happens, start troubleshooting to find out why the set is not getting power.

COMMON TV AILMENTS AND CURES

Nothing happens when you turn the set on.

1. Make sure it is plugged in.

2. Or, unplug the set and plug it in somewhere else.

3. Or, make sure the wall plugs aren't controlled by a wall switch that is turned off.

4. Check the CIRCUIT BREAKER (an electronic,

WORDS TO KNOW

VHF Very High Frequency. Channels 2 through 13 are called the VHF channels.

UHF Ultra High Frequency. Channels 14 through 83 are called the UHF channels and are selected on a separate tuning knob from the VHF channels. The UHF channel selector is usually activated when the VHF channel selector is turned to the position marked "UHF" or "U." UHF and VHF channels each have their own fine-tuning knobs.

AC Alternating Current. Current from a wall plug; house current. AC is used to run all TV equipment *except* items designed to run on batteries. For equipment that operates on either kind of power, there will be a switch to select the proper type of current.

DC Direct Current. The current supplied by batteries.

TV Receiver A television set like the one you have at home. It connects to an antenna and shows channels 2 through 13 and usually channels 14 through 83.

AFT Automatic Fine Tuning. Pushing this button helps tune the set to the station and sometimes turns on other automatic circuits in the receiver.

Cable Ready A TV able to receive cable TV signals directly, without needing a separate converter box. TVs that pick up more than 82 channels are cable ready.

resettable fuse), usually indicated by a red button on the back of the set. If the set comes on shortly after you push the button, fine. If it blacks out again, however, something is wrong. Don't use the set.

5. If the set is the portable type, designed to run on batteries, look for a power selector switch labeled BATTERY/AC or CHARGE and be sure it is set to the AC position, or *away* from CHARGE.

6. If none of this works, read the instruction booklet.

Now that your set is on, you still may not get good picture and sound. Here's what can be wrong and what to do.

Good picture, no sound

1. Check the volume. Is it turned up enough?

2. Make sure there are no headphones plugged into the set (they may automatically cut off the sound).

3. Flip channels. If none of the channels has sound, the problem is in the receiver. If only the one channel has no sound, the problem is in the transmission from the station, or you're watching a silent opus with Theda Bara and Rudolph Valentino. (Some television programs have no sound.)

Sound but no picture

1. If the picture is black, turn up the BRIGHTNESS control.

CONTROLS ON A TV SET

On/Off, Volume Gives power to the set and increases loudness of the sound.

Contrast Makes the whites whiter and the blacks blacker.

Brightness Makes blacks and whites both whiter. In brightly lit rooms, the brightness should be turned up to make the picture more visible; but in dimly lit rooms it should be turned down, thus affording greater picture detail.

Vertical Hold (or Just Vertical) Stabilizes the picture and keeps it from "flipping" or "rolling."

Horizontal Hold (or Just Horizontal) Centers the picture and keeps it from twisting into a bunch of diagonal lines. Sometimes this control is in the back of the set; sometimes it is even hidden behind a hole in the cabinet and requires adjustment with a screwdriver (however, a Vodka Collins will do).

Channel Selector Picks the channel you want to watch.

Fine Tuning Tunes in a channel exactly, to improve picture and sound.

Automatic Fine Tuning or AFT or AFC When pressed, this control automatically FINE TUNES your channel and sometimes activates other automated circuits.

Color Intensity (or Just Color) Adjusts how saturated or pastel the colors become.

Hue or Tint Adjusts the greens and reds to balance, not overpower, each other.

Some sets also have the following:

Sharpness or Detail Makes the picture sharper; it is usually left in the sharpest position.

Tone Makes the sound sharper and less bassy.

Distant/Local A switch, usually near the antenna, that adjusts the antenna sensitivity. Unless you're very near a TV station, leave the switch on DISTANT for best results.

2. If the picture is gray and washed out, turn up the CONTRAST.

3. Again, flip channels. Something may have temporarily stopped the picture transmission from the station.

Both picture and sound, but the picture . . .

1. Is not centered on the screen (as in figure 1.1).

Figure 1.1 Picture not centered—horizontal adjustment needed.

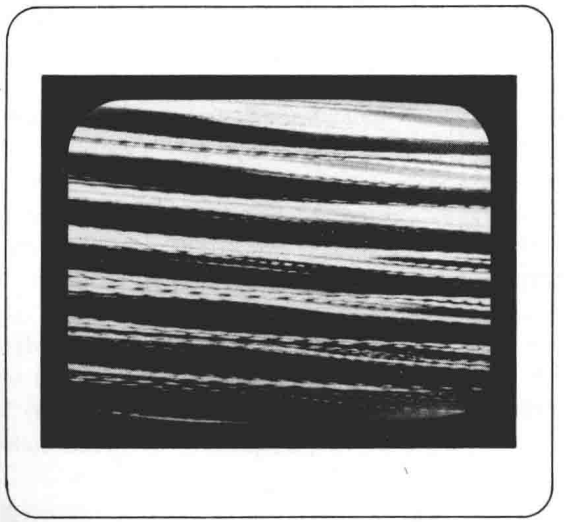

Figure 1.2 Diagonal lines—adjust horizontal hold.

Adjust the HORIZONTAL control. If you can't find it on the front of the set, look on the side, in back, or behind a trap door below the screen. Sometimes it's hidden behind a hole in the cabinet and must be adjusted with a long screwdriver.

2. Has diagonal black lines through it (as in figure 1.2). Again, adjust the HORIZONTAL control.

3. Flips or rolls (as in figure 1.3). Adjust the VERTICAL control until the picture is stabilized in the center of the screen.

4. Looks murky (as in figure 1.4). Dark places fill in and everything looks very black or very white with no grays. Adjust the CONTRAST control.

The program and receiver are in color, but the picture is only black and white.

1. Adjust the COLOR or COLOR INTENSITY control that governs the amount of color in the picture. If it is too low, the picture will look washed out; if it is too high, the picture will be too vivid to watch comfortably.

2. Adjust the FINE TUNING. For best results, first switch off the AUTO, or AUTO COLOR or AUTOMATIC FINE TUNING or AFT or AFC button (if your set has one) before adjusting the FINE TUNING. Then adjust the FINE TUNING control, which is probably a knob concentric with the channel selec-

Figure 1.3 Vertical roll—adjust vertical control.

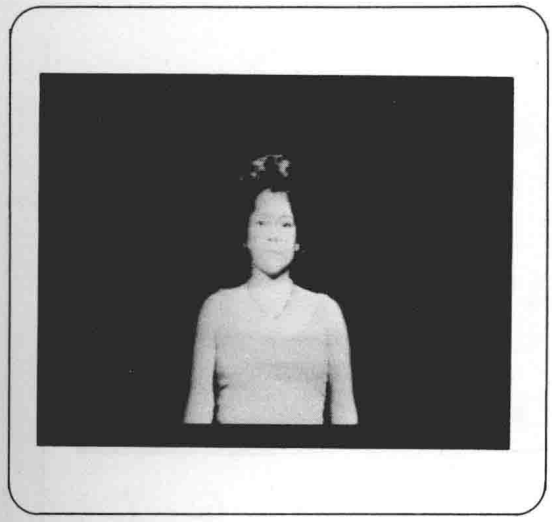

Figure 1.4 Picture needing contrast adjustment.

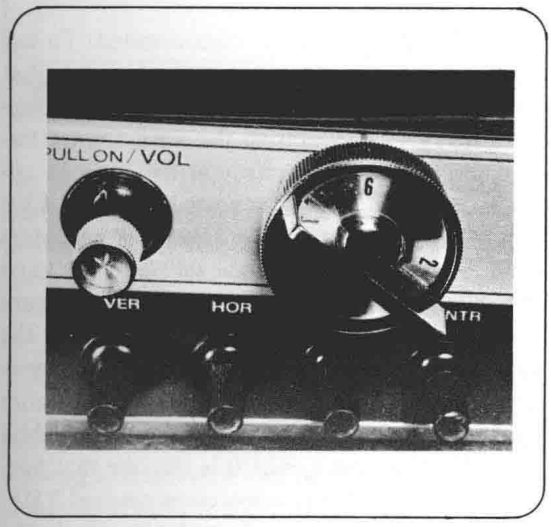

Figure 1.5 Channel selector and concentric fine-tuning dial.

tor (as in figure 1.5). On some sets you have to push it in and then turn it to make the dial work. When adjusted in one direction, the picture becomes soft and fuzzy. When adjusted in the other direction, the sound may become raspy and cause wavy lines in the picture while the picture becomes rough-edged and grainy (as in figure 1.6). If you adjust to this second position and then back up just a little until

Figure 1.6 Fine tuning at one extreme, showing a grainy picture with a herringbone pattern in it.

the picture is sharp and the sound is good, you will have a well-tuned picture. The color may even come on. Now reactivate the AFT or AUTO control (or whatever), and your picture should look the best it can be.

The show is black and white, but your color receiver keeps flashing colored splotches over the picture.

1. Turn the COLOR INTENSITY knob down all the way.

2. Or, turn off the AFT.

3. Or, turn off the AFT, then turn the FINE TUNING farther toward the soft, fuzzy picture position until the color flashing stops.

The receiver and show are both in color, but the color looks terrible.

1. First turn off the AFT, AUTO COLOR, or whatever.

2. Then adjust HUE and COLOR to suit your tastes. Use someone's face as a guide to good color. When the flesh tones are just right, everything else generally looks good.

3. If this doesn't help, make sure the FINE TUNING is properly adjusted.

4. Finally, turn the AFT back on.

5. Do not mess with any color knobs in the back of the set. They will undoubtedly confuse the issue.

The picture has grain, snow, or ghosts (as in figure 1.7).

1. Adjust the FINE TUNING as previously described.

2. If the set is operating on its own antenna, whether one or two VHF "rabbit ears" or a clip-on UHF bowtie or loop, aim the antenna in various directions to see what happens. If the antenna is a telescoping one, be sure it's all the way out to full extension.

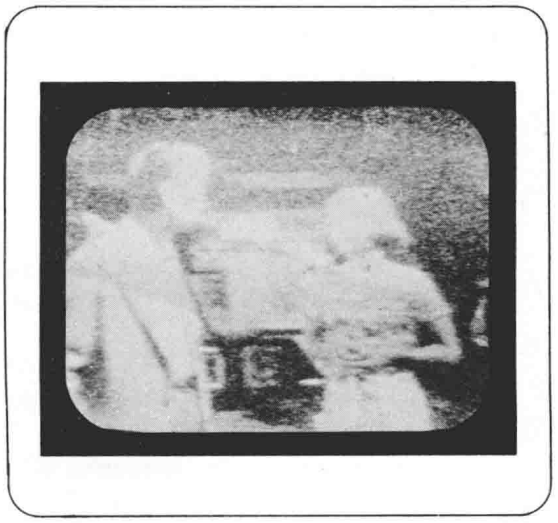

Figure 1.7 Snowy or grainy picture.

SETTING UP A TV RECEIVER FOR USE

You are handed a TV receiver and take it to the room where it is to be used. After plugging it in and turning it on, your next endeavor is to get the TV signal into the set so that you have a clear picture and good sound. For this you need an antenna, unless you are receiving your TV signal from a cable company.

If you get cable TV and have a CABLE READY TV set, connect the cable to the back of your set in the same place where your antenna would go. If your set isn't CABLE READY, it will receive some, but not all, of the cable channels. To receive all, you will have to connect a cable TV converter between the cable and your TV set, tune your set permanently to channel 3 (in some places the channel may be different), and do all your tuning on the converter box.

If you are using an antenna and are in a neighborhood where TV signals are strong (for example, twenty miles from the TV station with no mountains or tall buildings between you and the TV transmitter), you can usually get a satisfactory TV signal from the set's own built-in antenna if it has one.

Because sometimes a TV set will use a separate, external antenna and sometimes it will use its own antenna, there is a place behind the set where the antennas are connected and disconnected. To use the set's own antenna, one must check to see that it is connected. This is sometimes achieved by flipping an ANTENNA switch to the INT (or INTERNAL) position, which means that the built-in antenna is automatically connected to the TV's circuits when the switch is in that position. Most times, however, you connect the set's antenna to its circuits by finding the appropriate wires (see figure 1.8), slipping the metal ends of the wires under the two screws, and tightening the screws with a screwdriver. It doesn't matter which wire goes under which screw so long as the wires from the rabbit ears (the VHF antenna, which is the one that telescopes) go to the antenna connection marked VHF. The little bow-tie or loop-shaped antenna is the UHF antenna and connects to the screws marked UHF. With this done, you're ready to watch TV.

If, however, you are distant from a TV transmitter, the rabbit ears will give you a grainy or snowy picture. To improve the picture, you need to disconnect the rabbit ears and connect the wires from a larger, more sensitive antenna in place of the rabbit ears. It doesn't matter which wire goes under which screws as long as the two bare wire ends are not touching each other or any other metal. Once

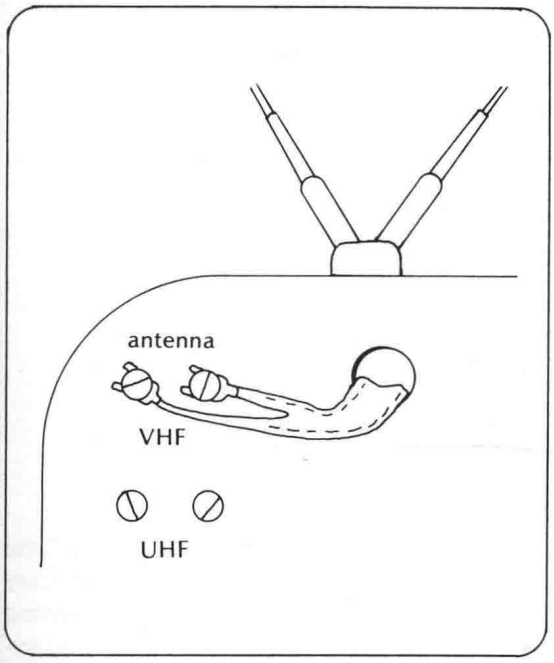

Figure 1.8 Connecting the internal or "rabbit ear" antenna.

the antenna is connected (as in figure 1.9), you're ready to use the set. For receivers with the INT/EXT switch, be sure the switch is set to EXT. (There is more about antennas in chapter 3.)

USING THE TV RECEIVER EFFECTIVELY

A TV receiver is only a machine. Under appropriate viewing conditions it can be a powerful tool. In the hands of a skillful user, the impact of television is greatly reinforced. Share the following viewing hints with colleagues, teachers, students, conventioneers, salespeople, and other users who wish to get the most out of this medium:

1. Avoid bright lights in the room or tilt the set slightly forward to reduce reflections and glare on the screen's surface.

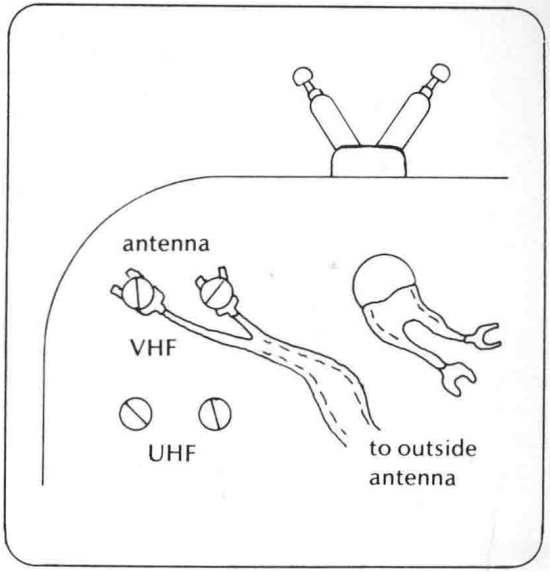

Figure 1.9 Disconnecting the internal antenna and connecting an outside antenna wire.

2. If the room is cursed with an unshaded window (or other bright light source), place the TV in front of the window. That way the screen will be shaded from the light and easier to see.

3. If the building is made of brick and steel and the TV has its own built-in antenna, place the TV near a window. TV signals travel poorly through brick and steel.

4. A 9-inch (TV screens are measured diagonally) screen can be comfortably seen by five or fewer viewers. A 21-inch TV screen is good for up to twenty viewers. For more than thirty viewers, definitely use more than one receiver.

5. If echoes are a problem, angle the set out from a corner of the room. Perhaps turning the TONE control to "sharp" will help, especially with the sounds of speech.

6. Television shows are most effective and are easily remembered when preceded and followed by some discussion of the subject shown.

2

TV MONITORS AND MONITOR / RECEIVERS

UNDERSTANDING AUDIO, VIDEO, SYNC, AND RF

When a television program is produced, whether "live" or by video tape recording, a camera takes the picture, changing it into an electrical signal called *video.* A microphone takes the sound, and makes another electrical signal called *audio.* And a special device called a SYNC GENERATOR creates a third electrical signal called SYNC that keeps the picture stable. When sync and video are electronically combined into a single electrical pulse, the signal is called *composite video.* Video without sync is called *noncomposite video,* but most TV people refer to them both simply as "video." Only in fairly advanced television work do you deal with both kinds and have to keep them straight.

The TV broadcaster combines the audio and video and sync and codes them into another signal called *RF.* The RF is transmitted, travels through the air, gets picked up by your antenna, and goes into your TV receiver. By turning your TV receiver to a particular channel (the same one that was broadcasted), a circuit in the TV set decodes the RF signal and breaks it up into video, audio, and sync, as shown in figure 2.1. The video goes to the TV screen, the audio goes to the speaker, and the sync goes to special circuits that hold the picture steady. Incidentally, by adjusting BRIGHTNESS, CONTRAST, HUE, TINT, and COLOR INTENSITY, you adjust the TV's video circuits. By manipulating the VOLUME control, you adjust the audio circuits. By moving the VERTICAL or HORIZONTAL CONTROLS, you adjust the sync circuits in your TV.

THE TELEVISION MONITOR

In contrast to a TV receiver, a television monitor does not play audio and does not change channels. All it does is display a picture that it receives directly from a TV camera or recorder via a wire or cable. Like TV receivers, monitors have on/off switches and controls for contrast, brightness, vertical and horizontal hold, and perhaps also for picture height and width, but they have no audio controls.

To feed a signal to the monitor, merely plug the video cable into the socket in the back of the set marked VIDEO IN, and a picture should appear on the TV screen (if there's a video signal in the cable).

CONNECTING THE TV MONITOR

How do you know when a cable has video in it? If you can't see where the wire is coming from, you can make a good guess as to what it carries just by