

## TROUBLESHOOTING

1. **PROBLEM:** No Picture  
**REMEDY:**
  - Remove lens cap
  - Open F-stop...it might be on "C" for closed.
  - Do you have power? Engage record button and look at battery meter.
  - Is there tape on the machine? If not, the trip lever near the pinch roller will shut off (it senses no tape) and therefore cuts off all power.
  - Is the camera plugged in?
  
2. **PROBLEM:** Out of focus  
**REMEDY:**
  - Adjust focus ring. Remember that the 1" viewfinder in the camera is rather small and critical focusing requires a sharp eye.
  - Lack of power causes loss of focus...Find yourself some power; use the AC power pack/recharger or the long-life battery pack.
  - Is the camera eyepiece clean? (Refer to #4)
  
3. **PROBLEM:** Picture seems "squashed"  
**REMEDY:**
  - VTR (video tape recorder) "camera/TV" switch may be switched to "TV". Make certain it is on "camera".
  - If problem continues, camera may need to be examined by technician.
  
4. **PROBLEM:** Spots in picture  
**REMEDY"**
  - Dust, dirt or stains on inside or outside eyepiece, lens or vidicon may cause spots. To clean, use only soft lens cleaning tissue. If spots persist, the vidicon may be "burned" and any future recording will show these spots or streaks until vidicon is replaced.
  
5. **PROBLEM:** VTR did not record  
**REMEDY:**
  - Did you forget to engage the "record" and "forward" buttons and press the trigger to start recording? Remember the red light in the camera viewfinder must show "red" to signal that you are rolling and recording.
  
6. **PROBLEM:** Picture seems "dirty"  
**REMEDY:**
  - Video heads are clogged (or broken). Fast forward the tape a little in hopes that the heads will somehow let loose whatever dirt or dust is clogging the heads. If problem remains, do not clean the heads unless you have been personally approved to do so...they are extremely delicate.
  - Occasional loss of some (very minor) lines of picture. This is called "drop-out" and is a permanent problem. Portions of the iron oxide (rust) on the videotape have been removed because of poor maintenance on the video heads. This should not cause too much loss of picture quality.
  
7. **PROBLEM:** Picture "jumps" at regular intervals  
**REMEDY"**
  - Tape was misthreaded during record. Tape can sometimes misthread itself if the VTR is juggled around too much during recording. Usually the tape does not proceed through the large roller (capstan) and the small roller (pinch roller). VTR operates most safely when operated in horizontal position.

8. **PROBLEM:** What you saw during record through your viewfinder is not what you got during playback.
- REMEDY:** -The camera viewfinder may need to be adjusted. In the interim, try to compensate by remembering to what degree and direction the picture is off and frame the picture accordingly.
9. **PROBLEM:** Tape counter does not work
- REMEDY:** -Rubber band pulley that moves counter inside VTR may have come off its track.
10. **PROBLEM:** No audio
- REMEDY:** -If you used camera mic and you have no audio, the audio head may be extremely dirty or broken, or the camera cable may have broken.  
-If you used an external mic, was it plugged in correctly? Was it turned "on" if it had an "on/off" switch?  
-The audio cables and/or connectors may be faulty. In order to determine where the problem lies, monitor audio by using earphone or headphone, place deck in "record", and jiggle each cable and connector separately as they are connected to each other. Thereby, hoping to "track down the problem".
11. **PROBLEM:** When using an RF adaptor to play back through a TV set, the image is faint and ghostly and the sound is not clear.
- REMEDY:** -Make certain RF unit selector switch is on "VTR". If the problem persists the RF unit needs to be adjusted by a technician.  
-You might also try turning channel selector around until you have your picture. And adjust the fine tuning dial.

## HOW TO RECORD WITH A PORTAPAK

OR:

NOW WHAT DO I DO???

1. Inventory all your equipment. Do you have everything in front of you?
2. Set up your VTR first. Thread it. Zero the counter. Make sure the switch that says "TV/Camera" on the side of the VTR is switched to "Camera".
3. If you are using the AC power charger for the VTR plug it into the VTR.  
NOTE: This machine must be "off" at this point. After it is plugged into the VTR, plug it into the wall outlet.
4. Set up your camera. Make sure the camera is level!!! Adjust the tripod if necessary.
  - a. Screw camera cable into VTR. Make it a secure but not too tight fit.
  - b. Take off the lens cap.
  - c. Open the F-stop so you have sufficient light.
  - d. Zoom all the way into your subject/object and then focus.
  - e. Now, compose your picture.
5. Place your microphone where you want it. REMEMBER: These microphones are omni-directional and pick up all kinds of background noises if not placed properly...in other words...as close as possible to your speaker.
  - a. If the person is talking at a podium, place the mic within 18".
  - b. If you are recording in a large hall or room you might pick up unwanted "echo" if your microphone is too far from your sound source.
  - c. In an interview situation, holding the microphone stationary between 2 people (equally spaced) will be alright.
  - d. Lavalier microphones (tie-clasp type) are available for you. These are place between 6-9 inches down from the speaker's mouth.
6. Now plug the microphone into "mic" on the VTR. REMEMBER: That this connection is not firmly rooted in this holder. Be careful not to dislodge the cable.
7. Plug your headphone (or earphone) into "ear".
8. Now you are ready to make a video and audio test, which is necessary to insure that everything goes correctly.
9. Fast forward the tape to approximately 008. (Remember that each digit on the far right equals 6 seconds. Therefore: 008 equals: 8 times 6 = 48 seconds. And, 106 equals: Ten minutes and 36 seconds. Now, make a 30-second test recording.
10. Stop record after 30 seconds. Stop by pushing in on the trigger. Now rewind the tape and watch and listen. Is everything clear and precisely the way that you want it??? If not, try to remedy the problem(s).
11. Rewind the tape to 004. (You need to leave a leader on the tape so that we can edit on a title for the tape. If you use a 2nd or 3rd tape for your program, you should start those tapes right at the beginning.)
12. NOW...you are ready to start recording. Why??? Because all the equipment that you have checked out is working correctly...

### SINGLE-SYSTEM PORTAPAK

Portapak = 1 camera and 1 video tape recorder (VTR) with built-in camera microphone and built-in battery...all of this weighs 22 lbs.

You can add to this basic system the following:

1. External microphone (shuts off camera microphone)
  - a. Omni-directional mic (picks up sound all around mic)
  - b. Lavalier mic (lapel-type mic)
2. Extra battery pack (provides up to 2½ hours of portable battery power)
3. AC power pack/battery re-charger (provides constant power from wall AC electrical outlet, also re-recharges internal battery at same time... re-charge takes 6-8 hours)
4. Headphone (allows you to monitor audio during record or playback)
5. Camera extension cable (each cable gives you 32 feet)
6. Mic extension cable (each cable gives you 25 feet)
7. Series box (allows you to use 2 mics at the same time and feed both sound sources into the recorder. NOTE: Does not allow you to regulate the volume of each mic.)
8. AC electrical extension cord (used to give you extra length between your AC power pack/battery re-charger and the wall outlet)
9. Tripod (holds the camera steady)
10. Monopod (works somewhat like a tripod, but has only 1 leg. Very flexible, but a little tipsy if you're not careful)
11. Shoulder pod (allows you to mount the camera on a harness-type holder over your shoulder. Gives you steadier control than hand-held camera holding. NOTE: Can be a little tricky to work with, so make certain that you fully understand how it works.)
12. RF unit (stands for "radio frequency"; allows you to play back your tape on your own home TV set when you use the portapak recorder. Also, when the RF unit is hooked up to the VHF antenna terminals of your TV set, and the camera is also hooked up to the recorder, you can see on the TV set what you are seeing through your camera viewfinder.
13. Videotape (for a portapak, comes in 30 minute reels, though they frequently run between 30-32 minutes)
14. Carrying case (you should always transport your video equipment inside this sturdy brown carrying case)
15. Mic stand (8" high microphone holder; good for panel discussion or similar activity where speaker, musician, etc, remains stationary)

THIS IS THE BASIC SYSTEM THAT WE LOAN OUT. USE OF THIS EQUIPMENT SHOULD PROVE SUFFICIENT FOR MOST RECORDING SITUATIONS. SEE ADDITIONAL COMMUNITY ACCESS CENTER EQUIPMENT LISTS FOR OTHER POSSIBLE EQUIPMENT.

YOU SHOULD KEEP THIS LIST AND BRING IT WITH YOU WHEN YOU TURN IN YOUR PROGRAM PROPOSAL. BY CORRECTLY KNOWING WHAT EQUIPMENT YOU NEED FOR YOUR PROGRAM YOU CAN SCHEDULE IT FOR CHECK-OUT. SCHEDULING OF EQUIPMENT SHOULD TAKE PLACE WHEN YOU SUBMIT YOUR PROGRAM PROPOSAL.

## EDITING

Editing allows you to re-arrange your audio and video sequences. Scene changes are made without any visual or sound break-up. Editing with videotape is not like the physical cut-and-splicing method of film. With video you re-record electronically. In other words, you transfer the audio, video and synch (pulse) signals from one deck (and one tape) to another. You end up with a 2nd generation copy. Disadvantages of editing videotape are:

1. It takes time to:
  - a. View all your material
  - b. Script
  - c. Actual editing time
2. Loss of quality in picture, sound and technical stability
  - 1/2" videotape has inherent technical instabilities that you may not notice at first. Each time you re-record a tape (i.e., make a dub/copy) you lose some picture stability. For example, under cablecasting conditions the picture might "jump", "flag or tear" at the top of the screen, or have other picture "noise". Under closed-circuit conditions you may not notice any depreciable problems. Overall picture quality as you go farther in dubbing, i.e., 2nd, 3rd, 4th generations, will show up as loss of sharpness, some grainyness, and the audio will begin to sound duller.

You can use the S.E.G. (special effects generator) when you edit. (refer to SEG section for all possible effects) You can also mix audio sources through the mic mixer; e.g., add a "live" voice over narration with the original audio.

Editing workshops are scheduled in advance through the Video Coordinator. They are usually limited to 1 person at a time.

Our policy regarding editing is: You should attempt to "edit-in-camera", i.e., tape each scene in succeeding sequence, as often as possible. As explained editing takes a lot of time and it can seriously affect the picture quality and stability of those programs that are cablecast. Editing is possible after you produce at least 1 program that has been cablecast. Please talk with the Video Coordinator should you be interested in learning how to edit.

Editing-in-camera is the most common form of editing. In other words, you start and stop your recording in order to create one whole scene. "Glitches" occur everytime you press and start your recorder. (a "glitch" is a brief visual break-up on the screen). You can "fade to black" by closing down your F-stop on the lens to "C" (close...no light enters the camera). Likewise, you can begin recording in this mode and then open the F-stop to let light in.

Audio dubs are easy to do. Simply it means to erase the previous audio and lay down new audio. This process does not effect the video. On the portapak (as on other recorders) there is a "sound (or audio) dub" button. By engaging this function you can feed in new audio. REMEMBER that you erase the previous audio. You can affect sound-on-sound only when you re-record the tape. If you want to audio dub the sound from a turntable, radio or audio tape recorder, you need to use a transformer between that sound source and the portapak (please consult with us on this useage). When you use a microphone for audio dubbing, you merely plug the mic directly into the "mic" input on the recorder.



## comax telecom corporation

BUFFALO, NEW YORK 14210

Executive Offices  
850 ELK STREET  
716-826-9000

### THE PANASONIC PORTAPAK Some Do's and Don'ts

A compilation of suggestions, warnings, and friendly advice for people who'll be using the Panasonic portapak system. This information was gathered from people who have been working extensively with both SONY and Panasonic portapaks....from actual human experience with this hardware. Also, see the Panasonic owner's manual for the NV-3082 portable system, the Spaghetti City Video Manual (published by Praeger Publications, L.C.# 73-6976) by Videofreex, Video Tools (from CTL Electronics, N.Y.C.), and various issues of Radical Software. Many thanks to Portable Channel, Inc., of Rochester, N.Y., from whose SONY Do's and Don'ts flier much of this information was amiably stolen.

#### REMEMBER FIRST AND FOREMOST:

- Don't aim your camera at any bright light sources, such as the sun, its reflections, flames, lightbulbs, still camera flashes.
- Don't leave the camera on when it's directed toward any dark objects also.
- Don't try to splice tape yourself. If it's absolutely necessary, have someone do it who's done it a lot, and who has some special videotape splicing materials. Also, don't put hands, food, or anything other than a smooth video-tape surface in contact with the tape path, particularly with the video heads.

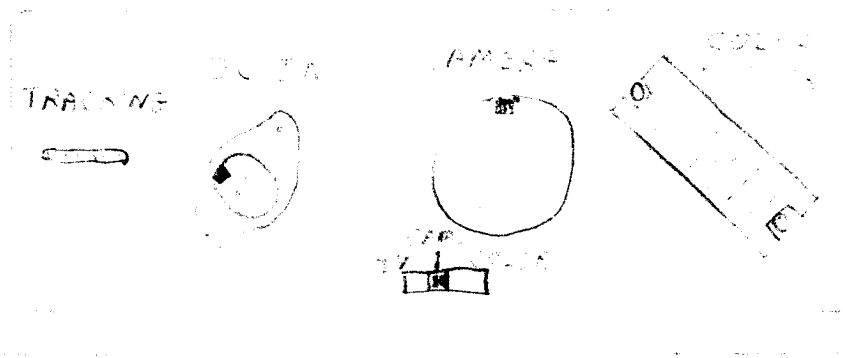
#### STORAGE AND TRANSPORT:

- If possible, keep the equipment on the car floor when moving, and take it all with you when you leave the vehicle.
- Keep the camera in a horizontal position; (on its side, not allowing lens to point downward).
- Keep all equipment and videotapes away from extremes in temperature, dust, humidity, moisture, sources of magnetism, and electronic noise like motors, generators, and voltage regulators.
- DON'T leave equipment in car trunks, or in vehicles parked in direct sunlight.
- Coil cables so that connectors won't be stepped on, and that cords won't be stretched.

#### RECORDING: (Also see Panasonic Portapak owner's manuals)

- Insert the camera cable ("10-pin") connector onto the portapak VTR with the notch on the connector towards the top of the deck; i.e., the windowed part of the machine. Turn the 10-pin connector's collar clockwise to tighten the connection.... NOT TOO TIGHT! Just hand-tighten about  $\frac{1}{2}$  turn.

(See diagram)



- Set the CAMERA/TV/COLOR ADAPTER switch to "CAMERA".
- To put the portapak system into "Standby" mode:
  - First, turn the power on by pressing the "POWER" switch on the VTR.
  - Then, simultaneously depress the "PLAY" and "RECORD" levers 'till they lock down, and let go.
- Remove the lens cap, look thru the camera, and then open the aperture, (the control on the lens nearest to the camera itself).
- When ready to record, press and release the trigger (remote control) switch on the camera. Then, you'll see a red light in the camera viewfinder.
- Press and release the trigger again to stop recording, and the red light will go off.
- Remember to press the VTR's "STOP" switch, AND turn off the "POWER" switch if you're not planning to record again right away....this prolongs the life of the batteries and/or the video heads.
- The picture in your viewfinder will fade out completely when you run out of tape, or if your battery runs down. In this case, stop the machine, & turn off the power.

PLAYBACK: \*

Note: You can playback immediately through your camera viewfinder. This is a good way to check out how things are working, and to show to people you've just recorded. You can hear the audio playback with the earplug, or with a headset.

- First rewind, then STOP, then playback with "PLAY" switch (without, this time, pressing RECORD). Repeat: DON'T press record this time.
- To play back onto a monitor adapted for the portable VTR, put the TV/CAMERA/COLOR ADAPTER switch onto "TV", and the TV/VTR switch on the monitor to "VTR". Connect the 8-to-10 pin cable from the VTR to the monitor.
- Also see "RF-UNIT", below.

RF-UNIT:

With an RF-Unit, you can play back through a regular TV set, as well as monitoring live with the camera. If your portapak is equipped with such a device, it will have a conglomeration of cables and adapters that eventually at one end can be attached to the screws labeled "VHF" on the back of any ordinary run-of-the-mill TV set. Our Portapaks at Comax Telcom put out a signal for Channel 6, so set your TV dial at #6, and fine tune it 'till it looks beautiful.

TAPE:

- Don't use computer tape; it will badly damage the equipment!!!!!!
- Keep the tape from extreme temperatures, moisture, and sources of magnetism....for example: THE TOP OF A TV SET OR MONITOR, or from greasy hands, & food.

\* An afterthought: If playback has lots of lines, & doesn't seem to be holding together too well, try adjusting the TRACKING control on the side of the deck. Leave this control in the "fix" position (clicked off) when recording, even tho' it shouldn't affect your recording.

- DON'T use tape that has been creased or scratched!!!! It could cut the delicate video heads apart, not to mention give you a horrible picture. If you crinkle tape, stop the machine and bring it back to us (don't be embarrassed, it happens to almost everybody), or if it's very important that you continue recording, and things don't look too serious, cut out that part of the tape which is at all crinkled, thread the machine again carefully with the partially-filled reels, and continue. Questions? Call us at 826-9000, (Buffalo area people only, of course; i.e., Greater Buffalo)... and ask for Channel 10.
- Tape can be recycled until it is visibly deteriorated with drop out, (lots of ugly little lines), at which point it should be discarded.
- Use recycled tape for practice, training, workshops, or for making copies (DUBS) of your tapes. You should use NEW tape if you plan to edit it, CABLECAST it, or if you want a permanent document. (Editing is a transfer process, and should always be done from the best possible original).
- Label tapes immediately with title and date, preferably before you shoot, so you won't get mixed up if there are several reels.
- Return all tapes to the tape library, & they'll be held to cablecast, to wait for editing, or to be recycled, whichever your desire (Note importance of labeling).

#### BATTERIES:

- Use the AC Power Adapter/Battery Charger when you can, to save the batteries.
- Internal Batteries: The batteries inside the Panasonic portable VTR can be expected to last up to ~~60~~ minutes, when fully charged.
- BP-30 SONY Battery: Lasts up to 3 hours when fully charged. Note: Don't overcharge this thing. Once you've used it, charge it overnight (10 hours approx.).
- Charge the Internal Batteries, if they're down at all, by plugging the AC Power Adapter/Battery Charger into the VTR, and turning on the charger. Don't turn the power on the VTR on, if you want to charge the batteries.
- You can check the battery level by turning on the portapak's power (when the AC Adapter is off), and looking at the meter on the VTR.
- If tape's threaded, and deck won't operate w/o AC Adapter, your batteries are down too far.
- If you have the machine more than one day, charge your batteries overnight please, if you've used them.
- You're not using up any battery power when you're using the AC Adapter.

#### AC POWER ADAPTER/BATTERY CHARGER:

- Use the power adapter whenever you're near a 110 volt AC outlet to save batteries, and when mobility is not crucial.
- First, plug the adapter into the wall. Make sure the power switch on it and the red light on it are OFF. Then plug the Adapter into the External power input on the VTR (See diagram); ALSO, the power switch on the VTR should be OFF at this time. (Remember when plugging in the AC Adapter that there is a notch on the input and a bump on the connector, to help you line them up). THEN, turn the AC Adapter's power on, and THEN turn on the power on the deck, if you like.

#### CAMERA:

- One of the nastiest things you could do to the Panasonic portapak's camera is to damage its light-sensitive vidicon tube by aiming the camera, consciously or unconsciously at an intense light source. THIS CAN HAPPEN WHEN



YOU'RE NOT EVEN SHOOTING!!! This could create a "burn" which is an ugly line that would appear in all subsequent taping with the damaged vidicon. So, here's what you should do:

- Don't let the camera point at the sun, its reflections or anything that resembles it.
- When you're not actually looking thru the camera, close the aperture, AND put the lens cap on. (The lens can be closed all the way to the "C" position.)

VTR (VIDEO TAPE RECORDER):

- Check that both reels are snug to their hubs.
- Always thread the deck with the power off, and the VTR switches all up. NOTE: You may be more likely to forget this if the camera has stopped, because of a jam or because the tape ran out...get in the habit of checking..OK? Thread the deck in a horizontal position. Check your threading job with the diagram on the lid, then run forward without recording and watch the tape transport.
- Close the lid carefully. The hinges are really lousy. If it is not closed properly, the lid will rub against the reels and dislodge or stop them. This causes what we call "spaghetti."
- It's better to thread the machine just before you shoot, or check it if you threaded it earlier. Re-check whenever possible.
- ALWAYS STOP AT "STOP" WHEN GOING BETWEEN REWIND AND FORWARD FOR A FEW MOMENTS. This is a spaghetti preventative.
- Take the trouble to OPEN the lid, when you can, to check what's going on, especially when rewinding.
- The VTR, wondrous as it is, is made of cheap plastic. Please treat it gently, and it will serve you well.

REMINDERS, AFTERTHOUGHTS, ETC.:

- Cable connectors are shoddy. Always disconnect with your hand on the connector, not the cable.
- Look before you insert cables into the deck. Remember the notches!
- LEAVE CLEANING AND MAINTENANCE AND REPAIR TO US!
- DON'T OPERATE OR SITUATE THE VTR UPSIDE-DOWN!
- THREAD THE PAK WITH THE POWER OFF!!!!!!

Note: Please don't let all of this information scare you. After a little practical experience with this equipment, all of it will be second-nature. This list is a checklist you should keep with you, and use if you're not sure of something.

If you have any other questions, comments, problems, or you'd just like to talk with us about portable hardware and software, call:

Andy Beecher  
Community Programming Coordinator  
Comax Telcom Corporation  
850 Elk Street  
Buffalo, New York 14210

PHONE: 716-826-9000, ask for Channel 10.

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#### BATTERIES:

- Use the AC Power Adapter/Battery Charger when you can, to save the batteries.
- Internal Batteries: The batteries inside the Panasonic portable VTR can be expected to last up to 90 minutes, when fully charged.
- BP-30 SONY Battery: Lasts up to 3 hours when fully charged. Note: Don't overcharge this thing. Once you've used it, charge it overnight (10 hours approx.).
- Charge the Internal Batteries, if they're down at all, by plugging the AC Power Adapter/Battery Charger into the VTR, and turning on the charger. Don't turn the power on the VTR on, if you want to charge the batteries.
- You can check the battery level by turning on the portapak's power (when the AC Adapter is off), and looking at the meter on the VTR.
- If tape's threaded, and deck won't operate w/o AC Adapter, your batteries are down too far.
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- First, plug the adapter into the wall. Make sure the power switch on it and the red light on it are OFF. Then plug the Adapter into the External power input on the VTR (See diagram); ALSO, the power switch on the VTR should be OFF at this time. (Remember when plugging in the AC Adapter that there is a notch on the input and a bump on the connector, to help you line them up). THEN, turn the AC Adapter's power on, and THEN turn on the power on the deck, if you like.

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Dear Customer,

Methods of converting a light image into an equivalent electrical signal that can be transmitted to a distant point and reproduced to form a facsimile of the original image is far from being something new! Actually, it outdates radio!

A German physicist, Paul Nipkow, is generally recognized as the inventor of the first workable television system back in the year 1884. His system incorporated mechanical rotating discs at both the transmitting and the receiving points. These discs had holes drilled in them in a spiral fashion in such a manner that the original image was scanned in much the same manner as modern day TV. The light variations (as reflected from the televised subject) were detected by a photocell located behind one of the discs. These impulses were then sent down a pair of wires and used to modulate a neon light located behind the receiving disc which was rotating at exactly the same speed as the one at the transmitting point.

Although very crude, it was one of the earliest devices capable of televising recognizable pictures to distant points over wires. It is somewhat ironic when one stops and thinks about it. Imagine, televising successful pictures 11 years before Marconi's first radio transmission and some 22 years before Dr. De Forest invented the triode vacuum tube! Quite a feat, to say the least, isn't it?

Today, over 90 years since that first successful experiment, applied TV is within the reach of virtually every industrial, educational, experimental and amateur user. Performance and reliability has increased to the point where excellent quality systems are available in the \$100-\$200 bracket. With the advent of transistorized circuitry and printed circuit boards camera kits can easily be assembled even by those of limited electronic training. Only within recent years has this become a reality!

Having been a manufacturer in the field of closed-circuit TV since early 1964, we here at ATV Research are very pleased to send you a copy of our latest applied TV catalog describing our line of cameras, camera kits, component parts and plans. We sincerely hope you find it to contain what you are looking for in order to meet your own individual needs.

Our long standing customer policy guarantees CUSTOMER SATISFACTION on all purchases. If not completely satisfied with any item, simply return in the original condition within 5 days of receipt and we will promptly send you a full refund including return postage. Furthermore, we warrant that all parts shall be free of all defects in materials and workmanship under normal useage for a period of 90 days from shipment and will be replaced upon verification that it is defective.

In addition, ATV Research promises to process all orders and correspondence promptly. To eliminate the bothersome job of figuring postage and insurance rates all orders are shipped postage paid anywhere in the USA, Canada and Mexico. Phone orders are shipped C.O.D. For your further assurance of mail order protection, ATV Research is a Dun & Bradstreet rated firm.

If we can be of further service please don't hesitate to get in touch with us.

Sincerely,

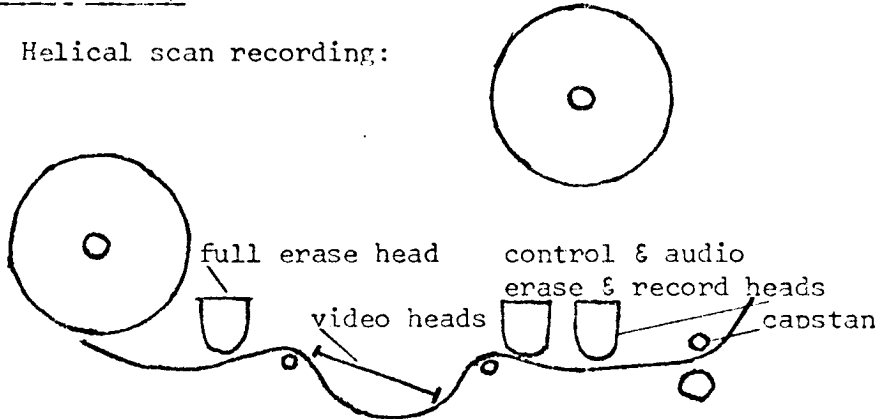


Mel Shadbolt, Pres.  
ATV RESEARCH

MHS/os

## Editing Theory

### I. Helical scan recording:



Video heads rotate in direction opposite to tape direction.



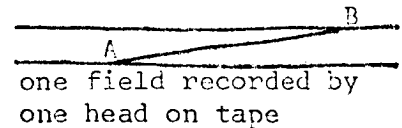
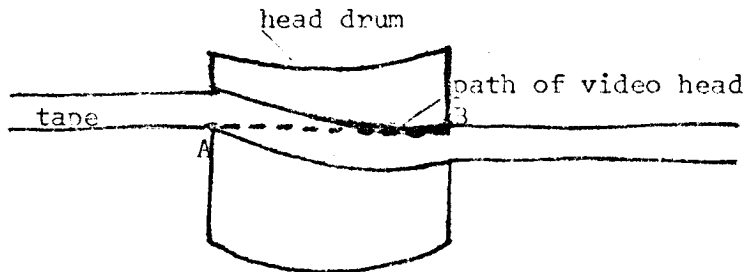
Tape is wrapped 180° around head drum assembly.  
One head is always in contact with the tape.

#### Head switching:

Two heads are briefly in contact with the tape simultaneously when the signal is switched from one head to the other.



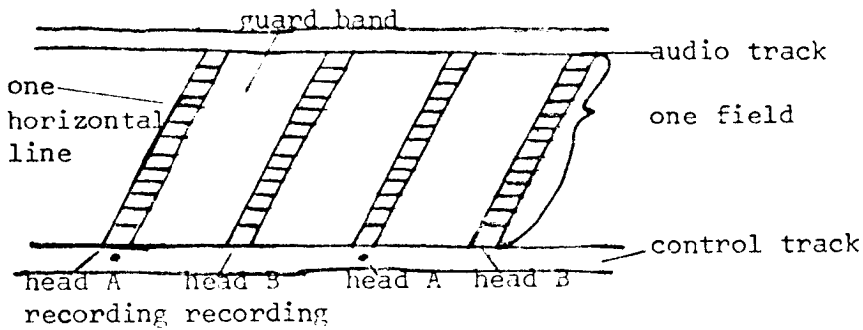
This prevents total loss of video image.  
Head switching occurs on the back porch of the vertical interval after the video tape drops its full height.  
This drop causes fields to be recorded on the tape diagonally.



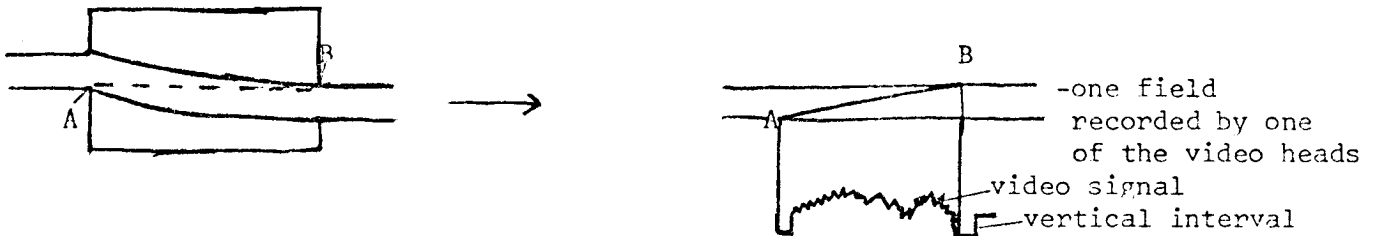
There are:

- 262½ horizontal lines in one field
- two fields in one frame (525 lines)
- 30 frames in one second
- 15,750 horizontal lines per second

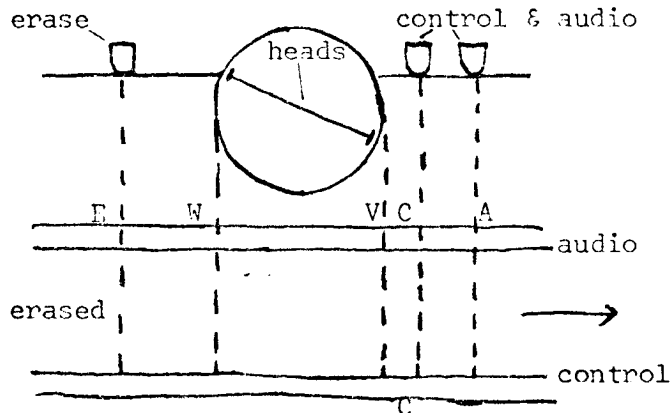
Information on the tape:



Guard band: spacing between recorded tracks due to tape motion.  
 Sync pulses are at top or bottom edge of tape.  
 Control pulses recorded for proper timing.  
 One field recorded by one head, next field recorded by second head - same head need NOT scan on playback the same field it recorded.



Head placement relative to recorded information:



Editing definition: editing is the selective reordering of the information on a video tape by physical or electronic means.

II. Means

A. Physical

Involves the physical cutting and splicing of videotape.

Because the tape fields are recorded diagonally, the cut must follow the diagonal and be located between the two fields of information.

A developing solution is available so that both video and control tracks are visible.

This method is not recommended:

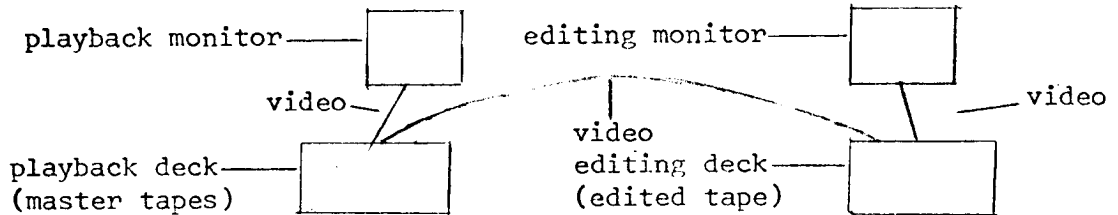
1. precise cut is almost impossible
2. a sticky tape is used to hold the spliced ends of the tape together; this tape attracts dust and may contact the video heads causing damage
3. even if cut is precise the two ends of tape must then be exactly aligned so sticky tape does not protrude or lie between two ends

B. Electronic

Involves the transfer of video and audio information from the master tapes to the edited tape; the transfer is done electronically.

Involves the playing back of the master tapes on one deck and the selective re-recording of information onto the editing deck.

Connections between the two decks:



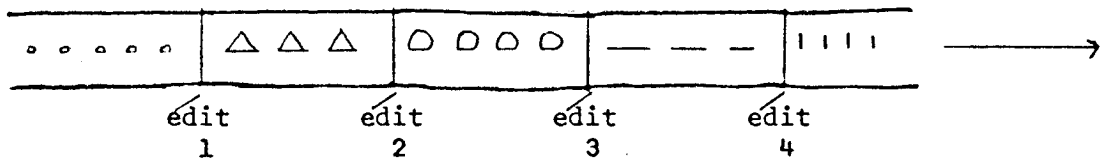
Assembly and operation can be found in the equipment manual under both general considerations and under the specific deck used. It is important to remember that editing involves transferring and results in an edited tape that is second generation; there is usually some loss of quality in the edited tape unless signals are processed.

III. Kinds

A. Assembly

Is the simpler mode in terms of electronics and in terms of operation.

Each section is added sequentially onto the end of the previous section.

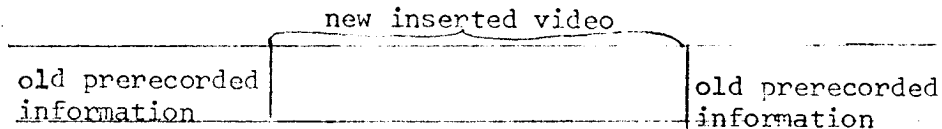


Method:

1. master tape on playback deck; new tape or erased tape on the editing deck
2. tape on playback deck is played back to desired cut in point
3. tape on editing deck is played back to desired cut in point
4. both machines are rewound so that both points will occur simultaneously and so that both machines will have playback for a minimum of 6 seconds before either point is reached
5. hit edit button
6. at end of edit, let both machines continue to run for about 20 seconds of overrun; this provides stable control track for beginning of the next edit
7. at the edit in point: record current applied to heads; new control track is recorded; erase head energized

B. Insert

New material is inserted into prerecorded material.



Method:

1. do not begin with a blank tape on the editing deck; editing deck has the prerecorded material into which new material is selectively inserted
2. editing deck must go from the prerecorded original material to the newly inserted information and return to the original prerecorded material without losing sync. This is a difficult electronic problem.
3. the prerecorded tape on the editing deck must remain in perfect step with the incoming new video to be inserted otherwise picture will roll and tear
4. the control track on the prerecorded tape on the editing deck must be preserved; the control track from the playback tape to be inserted cannot be transferred to the edited tape, otherwise tearing and rolling will result
5. set up and operation of insert is same as for assembly
6. specific operation of controls on editing deck may not be identical; it is important to know the machine with which you are working
7. see equipment manual for further details
8. insert edits require the same 6-10 second lead in time so decks can lock together

IV. Requirements of Editing

- A. Editing deck must have elements which are servo controlled.

The new video section must always be in step with the video already on the edited tape.

The vertical and horizontal sync pulses from the playback tape and from edited tape must happen at the same time. The incoming video must be in the same time frame as the video already on the tape.

So, the transition from the playback of information already on the tape and the recording of the new information (the next edit) is not disturbed.

The vertical intervals of the incoming tape and the vertical intervals already on the edited tape must be aligned.

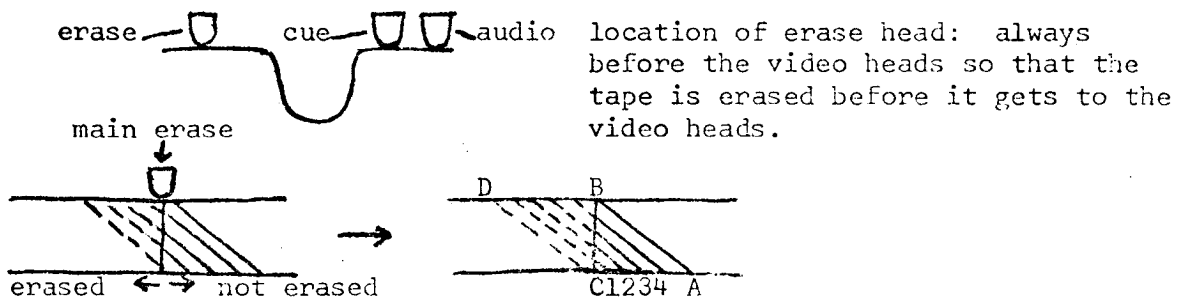
This is accomplished by the servo controlled capstan on the editing deck which varies slightly the tape speed on the editing deck until the sync pulses on both tapes coincide.

The incoming video from the master tapes has the sync stripped off and compared to the control pulses on the edited tape; the capstan servo then adjusts the speed of the editing deck until the sync pulses from both master and edited tape occur in the same time frame.

The head servo of the editing deck then adjusts head position of the editing deck for proper tracking on pal playback.

Once this alignment has occurred, then the edit can be made and there will be no picture disturbance.

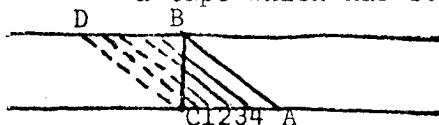
B. Erasing of video information on the edited tape must be selective.



field A-B is last full field not erased  
 field C-D is first completely erased field  
 fields 1-4 are all partially erased

Methods of erasing:

1. activation of main erase head on the editing deck produces a tape which has some video tracks partially erased



1-4 are partially erased

When video heads then begin the recording process, they cannot insert the new video into the partially erased fields; the new video then does not replace the total field and there is a section which is partially erased.

Problem: This produces a crawling noise bar which travels over the picture briefly.



2. increase the video head current for 3-3½ seconds  
 Increased head current for 3 seconds is a long enough time period to cover the distance between the beginning of the partially erased section and the end of the partially erased section (which is the beginning of the fully erased section).  
 Problem: if the servo of the editing machine is not locked then a moire pattern appears on the edit point.  
 Problem: can't attempt more than one edit at this point because the increased head current won't cover the edit point which already has increased current.
  
3. flying erase heads  
 Flying erase head is located immediately before the video head and scans the video track just ahead of the video head. Erases one entire field at a time so there are no partially erased fields.  
 Problem: the flying erase head must track the recorded tape precisely; alignment is critical to the success of this method.

## V. Erasing Methods in Assemble and Insert Edit Modes

### A. Assemble

1. at the start of an assemble edit:  
 Erase head activates W-V section is not erased.  
 Video heads begin to record.  
 Heads must record over the W-V section that wasn't erased.  
 Head current is increased for about 3 seconds so heads can record over this section.  
 Head current then returns to normal.
  
2. at the end of the edit:  
 Section E-W is erased but is not recorded on.  
 Suggested: that edit process continue beyond the point at which the following new edit will begin to lay down a solid control track.

### B. Insert

Because the cut in AND the cut out point must be precise, the full erase head method cannot be used; that would leave a small section of tape erased but with no new video on it.

1. increased head current for duration of the edit  
 Old video is recorded over and there is no erasing done.
  
2. flying erase  
 At cut in point flying erase is fed erase current and wipes video track just ahead of heads recording video.  
 At cut out point, erase current cut and video reverts to old video.
  
3. use of full erase head (on older machines only)  
 Operation then requires that edit button for cut out be hit 3 seconds before actual edit out point.

Erase current is cut and video heads record over the unerased section for 3 seconds before video is cut out.

#### VI. Switching of the Edit

timing of the switch of the edit:

##### A. Random

Change to the new video occurs when the button is hit; this means switching does not necessarily occur at the beginning of a field except accidentally.

Switching point may be seen on slow motion playback.

##### B. Vertical Interval Switching

Change to new video occurs only during the vertical interval that happens immediately after the edit button is pushed.

Switching cannot be seen.

#### VII. Control Tracks in the Editing Modes

Every recorded tape has a control track recorded on it.

Control pulses insure that correct timing occurs on playback and recording.

Refers to the timing relationships of the sync pulses.

##### A. Assembly Edit Mode

The tape on the editing machine is black thus does not have a control track on it OR the tape on the editing deck is recorded on but will be erased as the editing proceeds. In this instance, there is a control track on the tape but it is erased.

The editing deck records a new control track as it records the new video throughout the duration of the assemble edit.

Both decks are played back for 6 seconds to allow the editing deck to lock itself to the control track on the master tapes;

new and old control tracks are in step; new control track is recorded in step with the old.

##### B. Insert Edit Mode

The tape on the editing deck is a pre-recorded tape which will not be totally erased. The object is to retain some of the prerecorded video and insert into this video some new video.

Thus, this tape already has a control track on it which will not be erased.

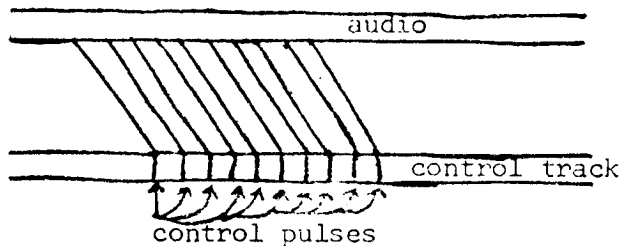
Thus, the new control track is NOT recorded on the edited tape.

Both decks are played back for 6 seconds before the edit point is reached to allow the editing deck to lock to the control track on the master tape. When they are in step the edit can begin.

The control track on the tape on the editing deck remains untouched.

#### VIII. Control Track Recording

Control track is recorded on the videotape as a timing pulse.



Occurs at half the rate of the vertical interval.

1. one control pulse each 1/30 of one second
2. control pulse rate is 30 Hz
3. there is one control pulse for every two fields or one control pulse for each frame

Servo controlled capstan allows the editing to adjust the tape speed until the control tracks on both tapes are in step.

To achieve this timing synchronization:

Both the playback deck and the editing deck must be rewound so that when each tape is played back they each play for a minimum of 6 seconds before the point at which the edit will begin.

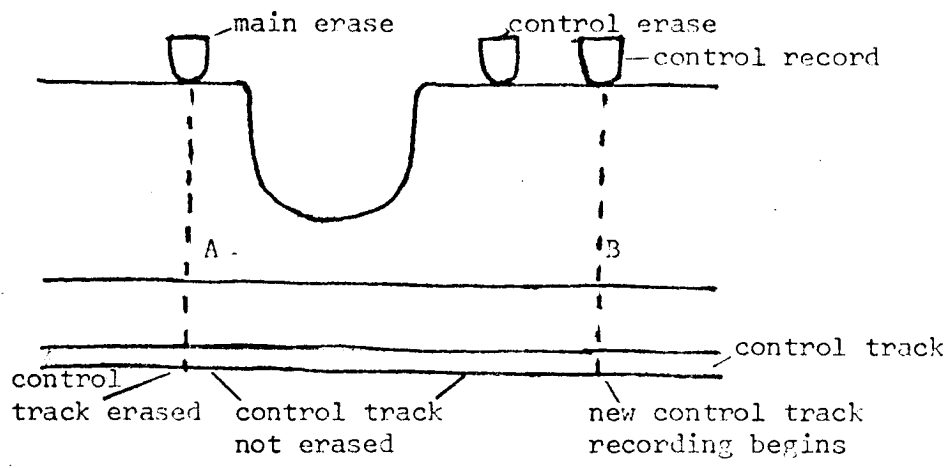
This 6 second interval is necessary so editing deck servos can lock to the control track of the incoming video information from the playback deck.

This 6 second period is the reason that material within a 6 second period following a camera edit or when the recording is stopped and restarted cannot be edited. There is no control track at that point so there is no control track for the editing deck to lock to.

Editing deck must have its own control track erase.

If there is no separate erase:

1. point A - control track erased by main full erase head
2. point A - point B - control track not erased
3. edit button engaged
4. point A - point B has old control track on it and a new one is recorded over it - produces bad edits



EDITING  
JVC

Note: This deck is not designed to be an editing deck. Edit points may be extremely unstable.

Assembly:

    playback deck may be any deck, JVC (FV-3500) is editing deck

1 - 4. same

5. settings on editing deck: b/w or color  
    tracking: Off  
    camera select

    if using two JVC decks: put playback deck on Dub

    put editing deck on Normal

    if using non-JVC as playback and JVC as editing deck: editing JVC deck on Normal

Assembly Edit:

6 - 8. same

9. JVC does not have a switch for assemble/insert/normal

10 - 11. same

12. at the edit point, push Edit button, then immediately push Record button. Release Edit button; Record button will stay down.

13. monitor video level if level meter is in manual mode

14. to stop edit, hit Edit button again. There will be a delay of several seconds after Edit button hit and image will be visible on monitor.

    Do not rewind the tape until monitor image has disappeared or the end of the edit will be erased.

15. Rewind the editing deck, do not change any settings and view the edit.

16. same

Insert Edit:

    same procedure as above. This mode is used only on a prerecorded tape into which will be inserted new video information.

Assembly diagrams:

    use either top or bottom system

    if bottom system is used: the JVC deck will permit the video signal from the playback deck to pass through it and be displayed on both monitors without engaging the Record button.

EDITING  
AV-3650

Note: This machine was designed to be an editing machine for black and white; it is not a vertical interval editing deck.

Assembly of system:

- 1 - 4. same
5. settings: Input select: Line  
Sync defeat: Normal  
Audio and Video Levels:  
if automatic control is desired, put on AGC  
if manual control is desired, put on Man
  - A) engage Record button
  - B) set audio so needle on meter reads in green
  - C) set video so needle on meter reads in blue

Note: DO NOT push down REC button if prerecorded tape is on deck. To disengage REC button, function lever must be moved to FWD or PEW and a small section of tape will be erased.

6. same
7. same
8. same
9. there is no switch for the edit function
10. same
- 11 - 12. Put both decks in forward mode at the same time so both are playing back. Several seconds before the edit point, depress the edit button. At the edit point, depress the Record button. The assemble edit is in progress.

Note: There is an audio lag on assemble edits due to electronics of the deck. Do a test edit to become familiar with this problem.

13. same
14. to stop edit, put function lever in Stop position. The edit and record buttons will disengage.
15. view edited sequence. If there is disturbance, put sync defeat switch in defeat position.
16. for next edit, return sync defeat to Normal and procede as above

Insert Edit:

This deck is not designed for insert edits.

## EDITING AV-8650

This deck is designed to be an editing machine for B/W and color; it edits on the vertical interval.

### Assembly of System

- 1 - 4. same
5. settings:
  - video mode: either color or B/W
  - tracking: off
  - tape select: either normal or high density
  - input select: on line
  - external sync switch: normal
  - to set video and audio levels:
    - Push down Record button; this allows the signals from the playback system to go through the editing deck and appear on the monitor. (E to E mode).
    - Note: do not push down Record button in the middle of pre-recorded information; to disengage Record button, deck lever must be put in Forward or Rewind and a small section of the tape will be erased.
  - audio:
    - Put Limiter in OFF position and adjust level so meter does not enter red area.
    - For manual control, leave in OFF position.
    - For automatic control, put Limiter ON.
  - video:
    - Put video on Auto for automatic adjustment.
    - For manual control, put on MAN and adjust level so meter reads within blue area.
6. same
7. same
8. same

### Assembly Edit

9. set mode selector to Assemble. Do not change position during editing process.
10. same
- 11 - 12. put both decks in forward mode at the same time, so both are playing back. Several seconds before the edit point, press down the edit button. At the edit point, press down the Record button. The assemble edit is in progress.
13. same
14. to stop edit: put function lever in Stop position. The edit and record button will disengage.
15. same
16. same

### Insert Edit

This deck allows the insertion of new audio and/or video information within a

prerecorded tape. This deck permits three different kinds:

- a) video/audio: this position allows insertion of new video and audio information.
- b) video only: this position allows insertion of new video; old audio is retained.
- c) audio only: this position allows insertion of new audio while retaining old video.

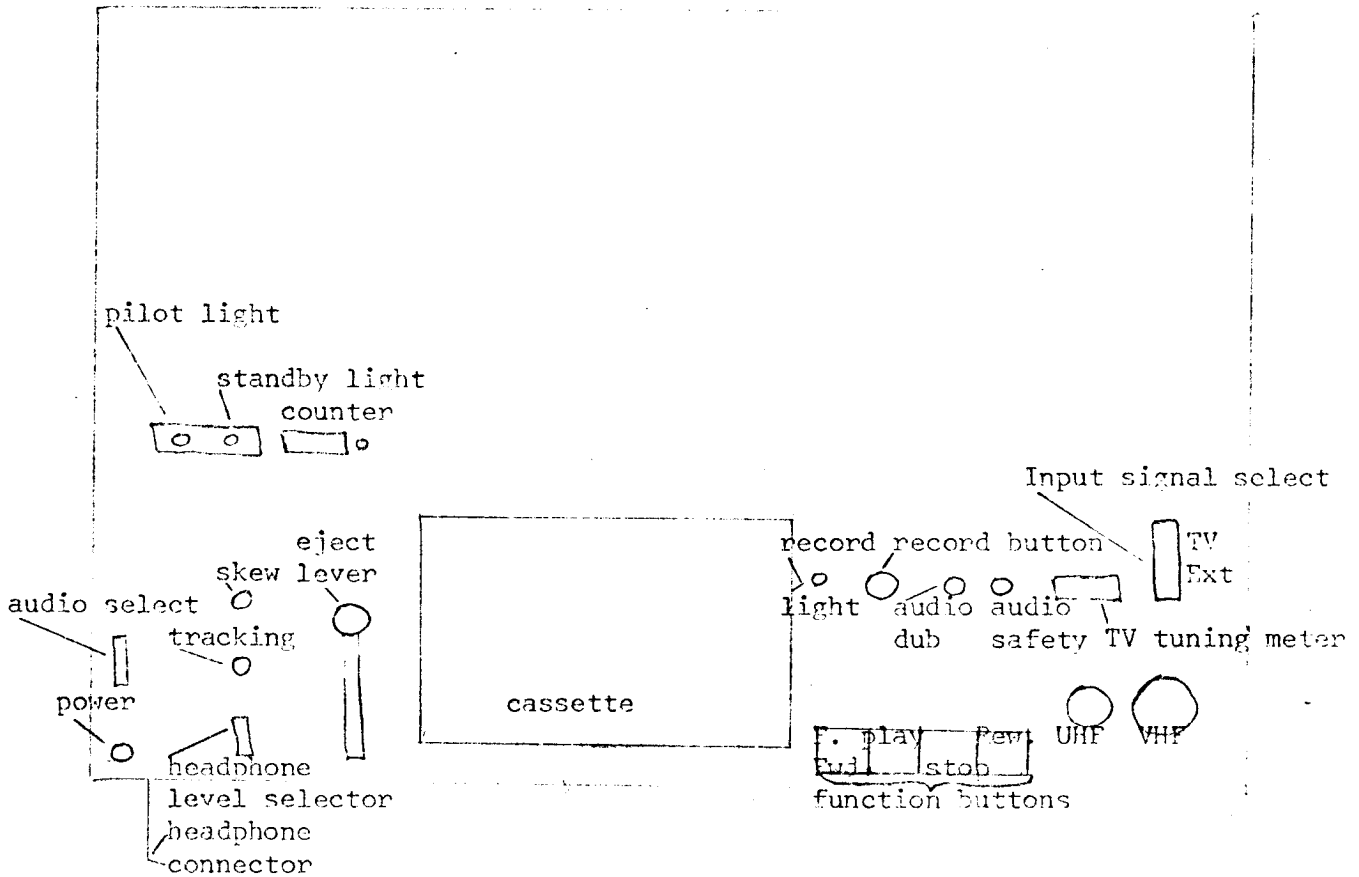
To Insert Edit

- 1 - 8. same
9. set on appropriate insert method
- 10 - 13. same
14. To stop edit, press CUT OUT button. The prerecorded tape will then playback.
- 15 - 16. same



SONY VO-1600

Top

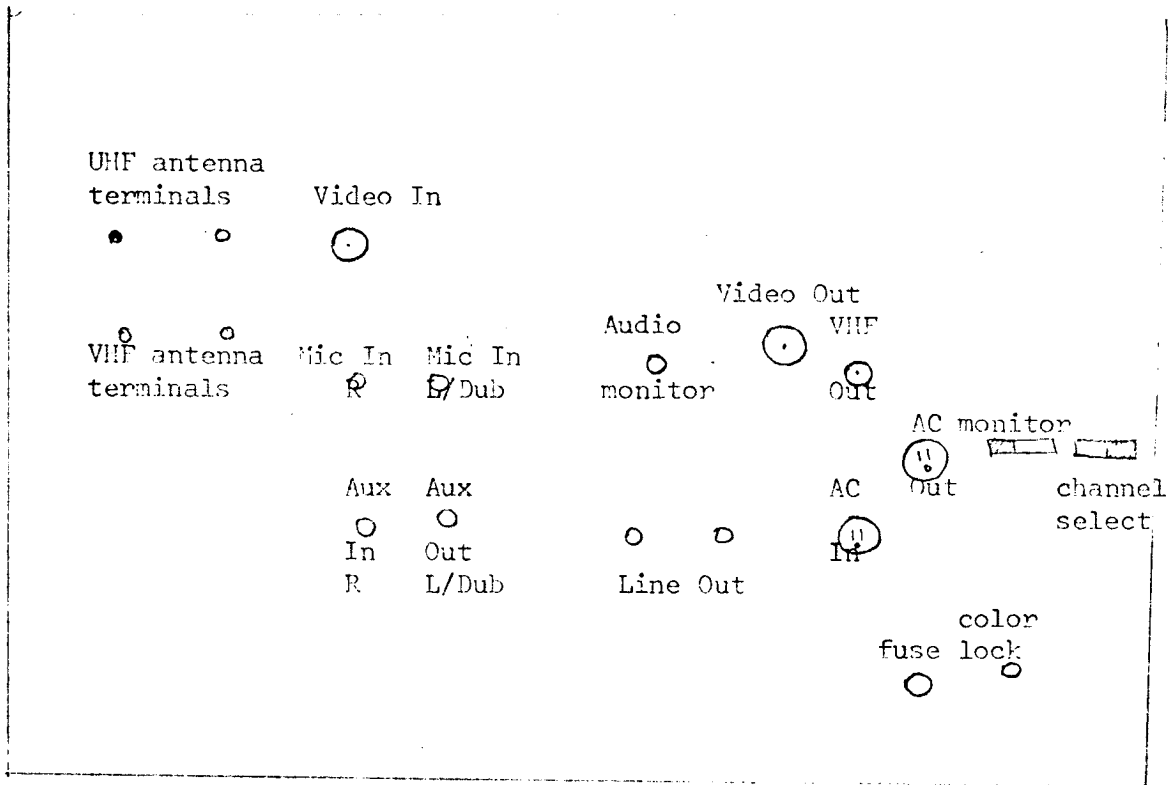


- |                        |  |
|------------------------|--|
| Power                  | Turns deck on and off  |
| Pilot Light            | Lights when deck is on   |
| Skew                   | Adjusts skew on playback only. Turn to operate.  |
| Tracking               | Adjusts tracking on playback only. Pull up and turn to operate. Push down if recording.  |
| Eject lever            | Permits insertion and removal of cassette. Pull down to raise cassette housing for insertion and removal. When cassette is inserted, it will drop down automatically and eject lever will return to upper position.  |
| Audio select           | 1 - to hear sound from number 1 (L) audio track<br>2 - to hear sound from number 2 (P) audio track<br>mix - to hear sound from 1 and 2 mixed and played on mono sound system<br>This is for playback on receiver: audio selector has no effect on audio signals at Line Out audio jacks. |
| Headphone connector    | use stereo headphones with 8 ohm impedance   |
| Headphone level select | 1 - soft; 2 - loud   |
| Input signal select    | selects source of video to be recorded   |

Function buttons  
 Standby light  
 Record button  
 Record light  
 Audio dub  
 Audio safety  
 TV Tuning meter  
 VHF  
 UHF

TV - for recording off-air  
 EXT - for cameras and processing systems  
 selects mode  
 when lit, do not press any buttons  
 for recording, see recording with VO-1600  
 goes on during recording  
 for dubbing new audio onto prerecorded tape;  
 see Recording with VO-1600  
 Used during audio dub  
 used for recording off-air  
 used for recording off-air  
 used for recording off-air

Back



UHF antenna terminals	connected directly to antennas for playback through receiver and recording off air
VHF antenna terminals	connected directly to antennas for playback through receiver and recording off air
Video In	video signal into deck with UHF connector
Video Out	video signal out of deck with UHF connector
Audio monitor	connects audio from deck to monitor
VHF out	connects to receiver for playback

Mic In	Right and Left channels for recording; Left is also used for dubbing
Aux In	Right and Left channels for recording; Left is also used for dubbing
Line Out	connected to stereo sound system for stereo audio playback
Monitor select	color or black and white
Channel select	for playback on receiver and recording off air
Color lock	adjusts color on playback

## Viewing A Tape

### SONY: U-Matic Cassette (VO-1600)

Please follow these instructions exactly. Damage may result from improper use.

1. Plug in VO-1600, monitor and separate speaker if used to 110 AC
2. A) Connect deck to monitor:
  1. Video Out from deck to Video In on monitor  
Set monitor selector to Color or Mono
  2. Line Out from deck to Audio In on speaker. If mono sound system used, either right or left line out can be connected, or Audio monitor may be connected to audio input of monitor.
- B) Connect deck to receiver
  1. VHF out from deck to VHF antenna leads of receiver
  2. Tune receiver to channel 3 or 4  
Put Channel selector in back on 3 or 4
3. Push power switch to turn VO-1600 on. The green light will go on.
4. Pull eject lever toward you.  
Insert cassette as far in as it will go.  
Once in the cassette will drop by itself and eject lever will return to high point.
5. Put deck on color or mono (B/W)
6. Press PLAY button. Orange standby light will go on. After several seconds it will go out and playback will begin.
7. At end of tape, machine will stop automatically.  
To stop tape in the middle, push STOP button.  
\* IMPORTANT: When Stop button hit, tape AUTOMATICALLY threads back into cassette. During this rewind process, the orange standby light goes ON. DO NOT do ANYTHING until this light goes out.
8. To remove cassette:  
Wait until standby light goes OFF.  
Pull eject lever down.  
Remove cassette.

#### Fast Forward:

To fast forward a tape:  
Go to Stop position and wait until Standby light goes off.  
Press fast forward.  
Press Stop when tape reaches desired point.  
Wait until Standby Light goes off, then press Play.

#### Rewind:

To rewind:  
Go to Stop position and wait until Standby light goes off.  
Press rewind.  
Press Stop when tape reaches desired point.  
Wait until Standby light goes off.

#### Skew control

Turn to adjust.  
Returns automatically to center when Record button pressed.

Tracking:

Pull straight up and turn for adjustment.

Return to original position by pushing down before recording.

Color lock:

May help to maintain proper hues on playback.

Pull out and rotate slowly until colors are correct.

Push in when finished viewing this tape.

Always rewind cassette completely after use.

DO NOT turn off power when standby light is on.

## Recording

### SONY Cassette VQ-1600

Please follow these instructions exactly. Damage may result from improper use.

1. Read carefully the instructions for viewing a tape.  
Follow instructions 1 and 2.
2. Connect video source to deck:  
With synthesizer: Line out to Video In of deck
3. Connect audio source to deck.  
Microphones: to Mic Inputs of deck  
Other sources, for example tape recorder or record player: to Aux Inputs.
4. Put Input signal selector to External.
5. Follow instructions 3 and 4 on 'Viewing a Tape'.
6. Press Record button. Monitor should display image.
7. Hold Rec button down and press Play.  
Standby light will go on; when it goes off recording begins.
8. Push Stop at end.  
To view: follow instructions for Viewing a Tape.

#### Audio dubbing:

Connect VQ-1600

In dub mode recording is on Number 1 (Left) track Only.

Connect sound source to either Mic In L/Dub or Aux In L/Dub.

At point when new audio is to be inserted press Audio Safety button.

Then press Audio dub button.

## RECORDING

### AV-3650

1. plug in deck, monitor and studio camera or CMA if using portapack camera
2. connect monitor and speaker to deck as for playback
3. connect camera to deck:
  - A) Studio camera
    1. AVC-3200  
video out from camera to video in on deck  
camera on internal sync  
deck on line  
OR  
6 pin camera cable from external sync on camera to camera on deck  
camera on external sync  
deck on camera
    2. UC-1  
video out from camera to video in on deck  
camera on line sync  
deck on line
  - B) Portapack camera  
use camera adaptor (CMA)  
10 pin from camera to 10 pin input on CMA  
6 pin from CMA to camera input on deck  
deck on camera
4. connect sound source  
mike: mike input  
auxiliary: sound source other than mike into aux in
5. thread deck while deck is in STOP
6. power
  - A) turn on monitor, camera or CMA
  - B) push power button on
7. settings: input select
  - A) Line: signal is coming into deck through video IN

### AV-8650

1. plug in deck, monitor and camera  
if using color camera, follow specific directions for color camera assembly first
2. connect monitor and speaker to deck as for playback
3. connect camera to deck; it is not possible to use a CMA with this deck
  - A) AVC-3200  
follow directions for video OUT assembly only
  - B) UC-1  
same
  - C) Color camera  
see separate instruction sheet for color camera
4. connect sound source  
mike: to mic input  
aux in: sound source other than mike  
headphone jack: headphones plug in here if sound monitoring with headphones desired during recording
5. thread deck while deck is in STOP
6. power - same
7. settings: Input select
  - A) Line: signal coming into deck through video IN
  - B) TV: signal coming into deck through TVexternal sync switch on normal tape select switch on normal if regular tape used, high density if high density tape used  
set video mode switch to color or B/W
8. to monitor  
push Record button down while deck is in STOP position. Record button will stay down

- B) Camera: signal is coming into deck through camera
8. to monitor
    - A) push record button down while deck is in STOP position. Record button will stay down
  9. adjustments
 

confirm monitor has video and speaker has audio  
adjust camera
  10. to record
 

hold record button down while moving lever from Stop to Forward. Release record button and it will remain down
  11. recording levels:
    - A) video level
 

AGC: level is set automatically  
Manual: level must be adjusted so needle is in blue area
    - B) audio level
 

AGC: level is set automatically  
Manual: level must be adjusted so needle is in green area
  12. if you stop taping in the middle of the tape and wish to begin taping again
    - A) turn function lever to Stop. Record button will come up.
    - B) follow above procedure for recording there will be visual disturbance where recording was stopped and restarted
 

or

 use the edit function; see editing.
9. confirm monitor has video  
speaker had audio  
make adjustments on camera
  10. same
  11. recording levels:
    - A) audio
 

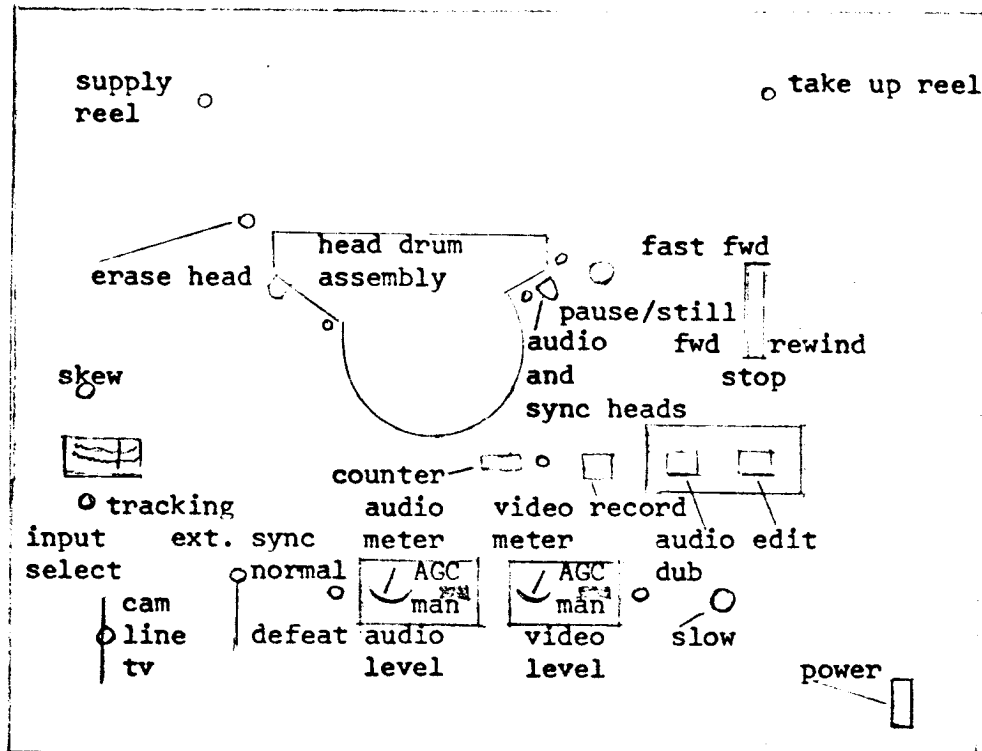
auto/limiter On/Off: selects either manual or limiter system. Limiter system limits peak level and some distortion on high audio signals.  
Set limiter to Off and adjust so needle does not swing into red area. Set limiter On.  
For manual audio control leave limiter Off.  
Level Meter: indicates audio signal on record and playback.  
audio level control: adjusts the signal as shown on meter.
    - B) video
 

auto/manual: can select either AGC or manual control of video signal  
Level Meter: indicates video signal on record and playback; keep in the blue area  
level control: adjusts signal as shown on meter.
  12. same



SONY  
AV-3650

Top



This deck is a 1/2" b/w record and playback deck with edit capability.

- Power:** When deck is plugged in, this turns the deck on and off.
- Skew:** Adjusts tape tension for optimum picture on playback only. If image on playback pulls to the left or right on playback, adjust skew.
- Tracking:** Adjustment can eliminate noise in image on playback only. Should be in off position when not in use.
- Slow:** This alters speed of tape in playback only. Pull to operate.
- Input select:** Indicates the source of the information which is to be recorded. Must be in proper position for recording.
- Cam:** use when the 6 pin camera input on back is the video input used.
  - Line:** use when the UHF coax Video In on back is the video input used.
  - TV:** use when the 8 pin TV on back is used as video and audio input.
- Sync Defeat:** Used only during editing. For recording and playback, switch is on normal. Place on defeat after an edited sequence has been made and the edited segment is being

2

**Audio Level:** viewed if there is disturbance in picture.  
During recording the audio signal level can be controlled either manually (switch on man) or by the automatic gain control function of the deck (switch on AGC).  
Manual: switch on man  
audio level knob is adjusted so the needle on the meter reads in the green area.  
AGC: switch on AGC  
audio level knob has no function; audio level is adjusted and controlled automatically.

**Video Level:** During recording the video signal level can be controlled either manually (switch on man) or by the automatic gain control function of the deck (switch on AGC).  
Manual: switch on man  
video level knob is adjusted so the needle on the meter reads in the blue area.  
AGC: switch on AGC  
video level knob has no function; video level is adjusted and controlled automatically.

**Function lever:** controls tape direction in record and playback: Stop, Forward, Pause/Still, Fast Forward and Rewind.

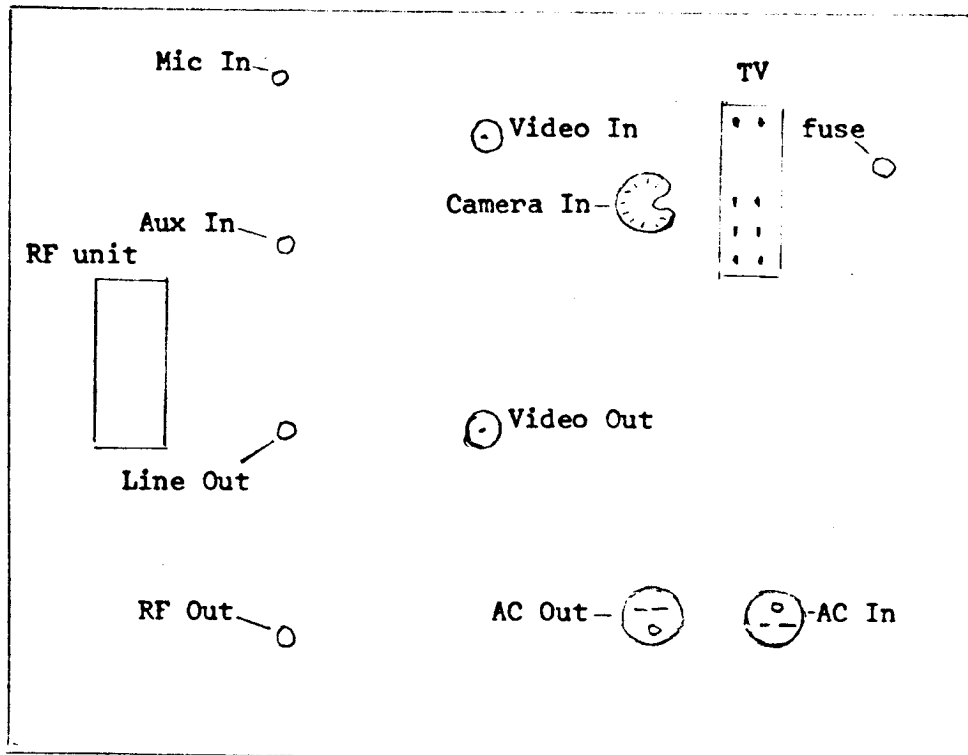
**Record:** Engages recording circuitry of deck. Push down only when deck is in stop position.  
To record: hold button down and move function lever from stop to forward; release button; button will remain down during recording.  
To end recording: move lever from forward to stop; record button will automatically disengage.

**Audio dub:** Permits the addition of new audio track on prerecorded tape while retaining video.  
To use: connect new sound source to appropriate audio input. Playback tape and push dub button down; new sound will be recorded and old sound, if any, will be erased.

**Edit:** See section on 3650 editing.

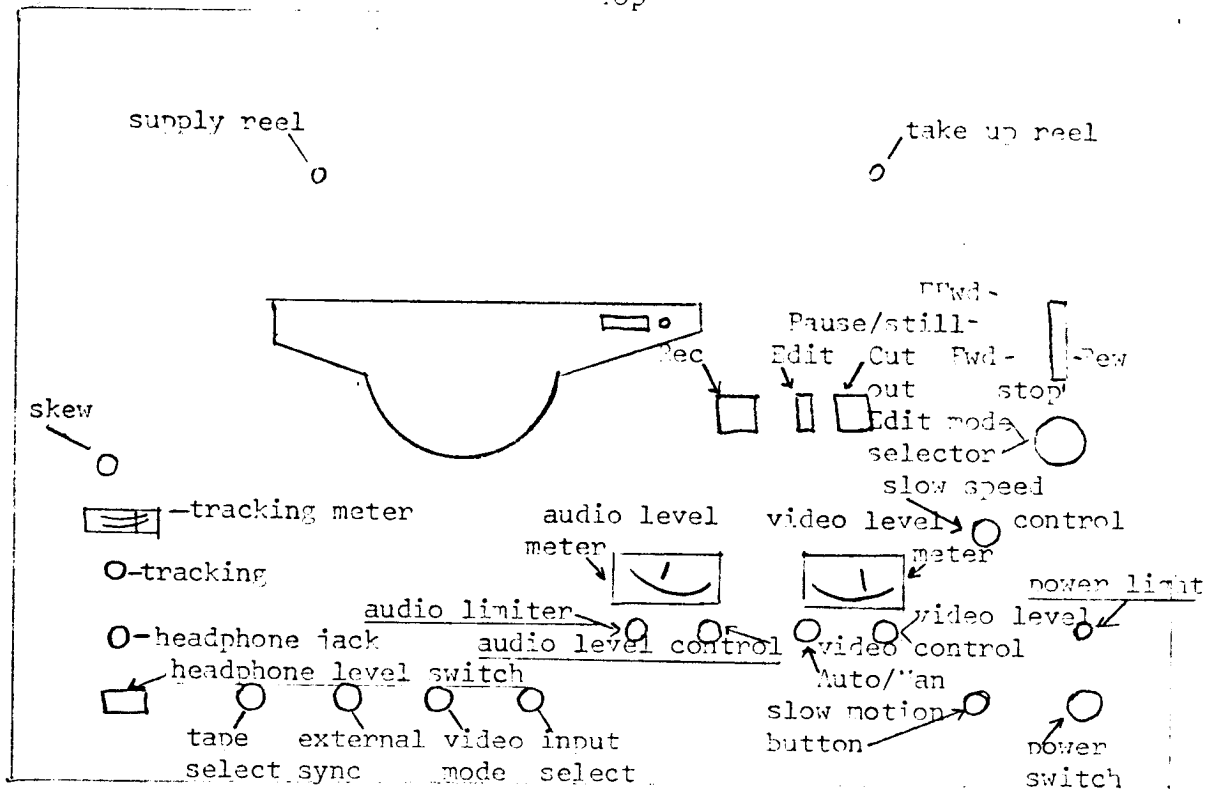
SONY  
AV-3650

Back



- RF Unit: If deck contains RF unit, located here, the RF out is functional and tape can be viewed on TV receiver.
- RF Out: male mini jack from RF out to VHF antenna leads of a B/W receiver allows tape to be viewed.
- Mic In: Microphone connected here.
- Aux In: Any other sound source except mike can be connected here.
- Line Out: Takes sound out of deck and into speaker or monitor.
- Video In: UHF female input for video signal from camera.
- Video Out: UHF female output carries video signal out of deck into monitor.
- TV: 8 pin connection carries both video and audio either into the deck to be recorded or out of the deck into a monitor.
- AC Out: Functions like a wall outlet; supplies 110 AC.
- AC In: Supplies power to deck.

Top



- Skew : Adjusts skew on playback only
- Tracking : Adjusts tracking on playback only
- Tracking Meter : Turn tracking control until maximum needle deflection occurs.
- Headphone jack : Use with headphones with 3 ohm impedance
- " level switch: selects one of two sound levels
- Tape select: selects regular or high density tape for recording
- External sync: Normal position: playback video signal locked to external sync applied to Video In  
Defeat position: playback video signal locked to internal sync
- Video Mode: color or black and white mode for record and playback
- Input select: selects source of video signal to be recorded: Line for use with Video In connector or TV for use with 8 pin TV connector
- Audio limiter: when on this helps to avoid distortion from high level audio signals; when on and audio signals are within normal range system acts as in a manual recording
- Audio level meter: indicates audio level during recording and playback

Audio level control: adjusts audio level during record only; adjust so needle does not travel into red area

Video Auto/Man: video level can be controlled manually or automatically

Video level meter: indicates video level during recording and playback

Video level control: turning during record only; needle should remain in blue area

slow motion: push slow motion button and turn speed control

Edit mode selector: selects kind of editing procedure

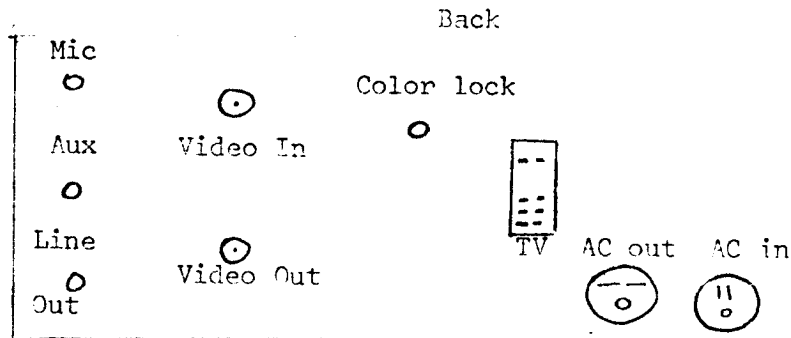
- a) assemble
- b) insert video/audio
- c) insert video only
- d) insert audio only

Cut out: stops all types of insert edit

Function lever: Fast Forward; Pause/still; Forward; Stop; Rewind

Editing button: Used for assemble and insert editing modes

Record button: Used in standby, recording and editing procedures



Mic: accepts microphone as audio input

Aux: accepts other sound source as audio input

Line Out: sound out of deck

Video In: video signal to be recorded connected here

Video Out: video signal to be sent to other recorder or monitor connected here

TV: video and audio signals from TV to be recorded or video and audio signals from deck to monitor are connected here

AC in: power for deck supplied here

AC out: power from deck

Color lock: color adjustment on for playback only

## VIEWING A TAPE

### AV-3650

1. plug deck, monitor and external speaker into wall outlet
2. A) connect deck to monitor:  

<u>deck</u>	<u>out</u>	<u>cable</u>	<u>monitor</u>
TV	8 pin	8 pin	

- both video and audio carried in one cord

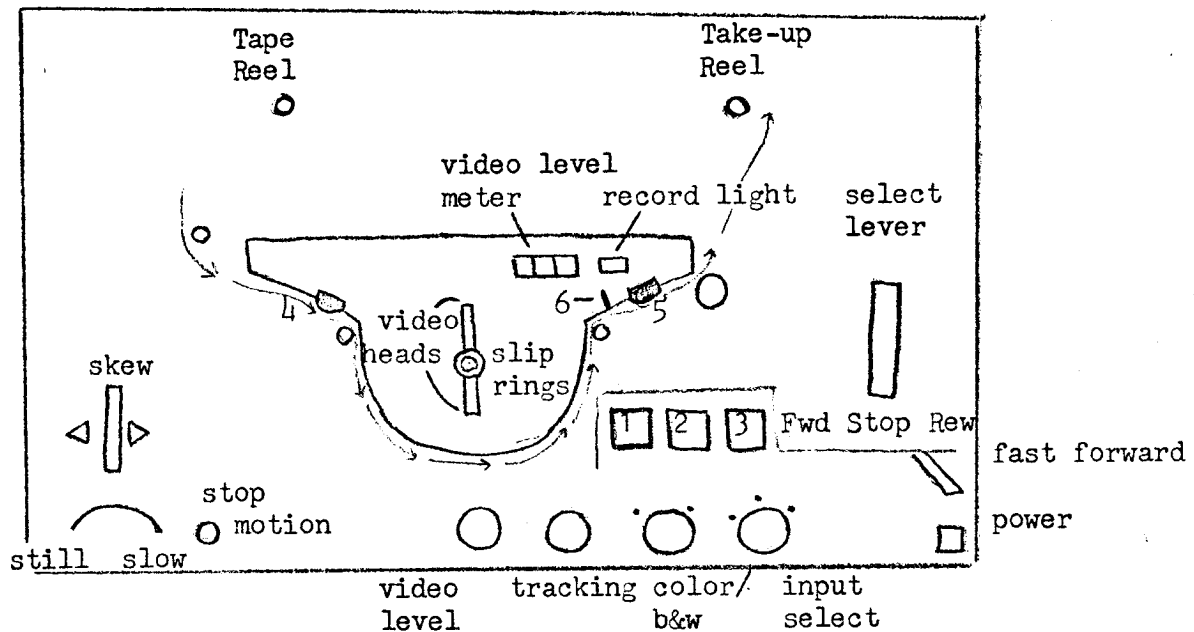
Video out UHF UHF or BNC and

Line out mini mini, RCA, or phone

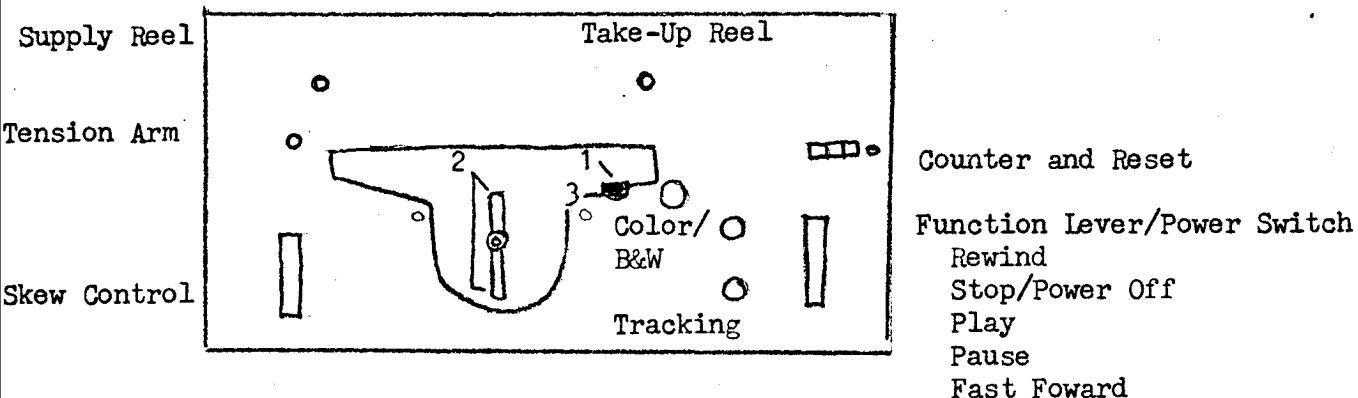
B) connect deck to receiver:  
RF out on deck to VHF antenna leads  
tune set to appropriate channel
3. thread deck; diagram on the front cover
4. power
  - A) turn on monitor
  - B) push power button on
5. settings
  - A) Input Select on Line
  - B) External sync switch on Normal
6. Function Lever  
Fast Forward and still/pause are functions of Lever
7. Skew control  
adjusts on playback
8. tracking control  
eliminates noise in playback  
adjust for maximum needle deflection
9. Slow  
pull up and adjust

### AV-8650

1. same
2. A) same  
B) not applicable without external RF unit  
with external RF unit connect to VHF antenna leads and tune to the appropriate channel
3. same
4. same
5. settings
  - A) Input-Select on Line
  - B) External sync switch on Normal
  - C) Tape Select switch on Normal if using normal tape or high density if high density tape used
  - D) set Video Mode switch to color or b/w
6. same
7. same
8. same
9. to slow speed of playback image, push Slow button and turn speed control to desired setting
10. Headphone jack and Level switch  
if you wish to monitor the sound with headphones, connect headphones to jack; switch permits one of two sound levels
11. audio and video meters display signal levels on playback



- Stop motion:** Push down to activate. As dial is turned in direction of "still", tape in palyback mode will play in slow motion. If dial is turned to left completely, tape will be still framed. Push again to resume normal speed.
- Skew:** Adjusts tape tension for optimum picture on playback
- Video level:** Must be adjusted during recording. Keep level on video level meter in blue area. Does not function on playback.
- Tracking:** Slight adjustment on playback may rid tape of tracking problem
- Color/B&W:** Select appropriate adjustment for recording and playback
- Input Select:** Selects Line, Camera or TV input. See below.
- Power:** Down turns deck on, up turns deck power off.
- Select Lever:** Forward for recording and playing back  
Rew for rewinding tape
- Fast Forward:** While Select lever is in Fwd. mode, move FFwd lever to left and let it return and tape will play in fast forward. To return to normal speed, turn lever to stop and then to Fwd.
- Record light:** Light is on only when recording.
- 1. Record button:** To record: Push button down and hold while moving select lever from Stop to Fwd. Then release and button will stay down. Do not push this down while you are playing back a tape.
- 2. Sound dub:** To make dub: push down only sound dub button at appropriate place on tape to record new sound over prerecorded tape.
- 3. Edit:** Used when editing with two AV-5000.
- Video heads:** Similar to heads on AV-3400
- Slip rings:** Similar to those on AV-3400
- 4. Erase head:**
- 5. Audio and Sync Heads:**
- 6. Automatic Cut Off Switch**
- TV position:** video and audio inputs from 8 pin TV connector
- Line position:** video input from Video In connector; audio input from Mic In or Aux. In.
- Camera position:** video input from 6 pin Camera; audio input from Mic In or Aux In
- Video output is always supplied to the 8 pin connector (TV) and Video Out.



Skew Control:

Image distortion on playback can be eliminated. If picture's upper portion is distorted toward left, move lever slowly to right. If distortion is toward right, turn lever slowly to left.

Tracking Control:

By adjustment you can eliminate noise in playback. Leave on Fix at all other times.

Color/B&W

Select appropriate setting for tape.

1. Audio/Sync Heads:

Reads sound and sync track for playback. Can be cleaned as with AV-3400, and AV-5000.

2. Video Heads:

Reads picture for playback. Can be cleaned in the SAME way as all video heads.

3. Automatic Cut-Off:

Will automatically shut off motor when tape is rewound onto supply reel or wound onto take-up reel. Turn Function Lever to Stop position when motor is shut off with this.

Function Lever:

Stop: Tape stops and power is off.

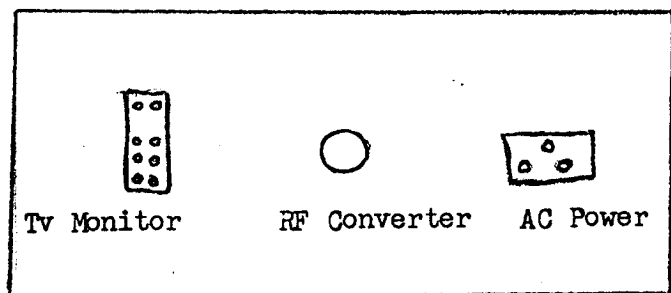
Rew: Rewinds tape rapidly. Put in stop position after tape is rewound completely.

F. Fwd.: Tape runs rapidly

Pause: for reproducing still images in playback.

Do Not move lever rapidly from one position to another. Pause at each mode to give time for tape to start and stop smoothly.

PANASONIC 3110 Rear



TV Monitor:

Use 8 pin cable for connecting deck to monitor

RF Converter:

For connection with RF Converter when playing back on regular TV receiver

AC Power IN:

Cord supplies power to deck.

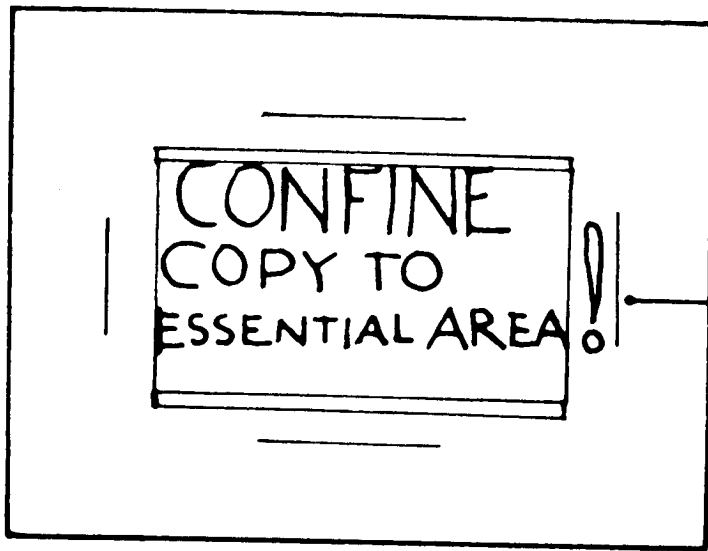


## The Gray Scale

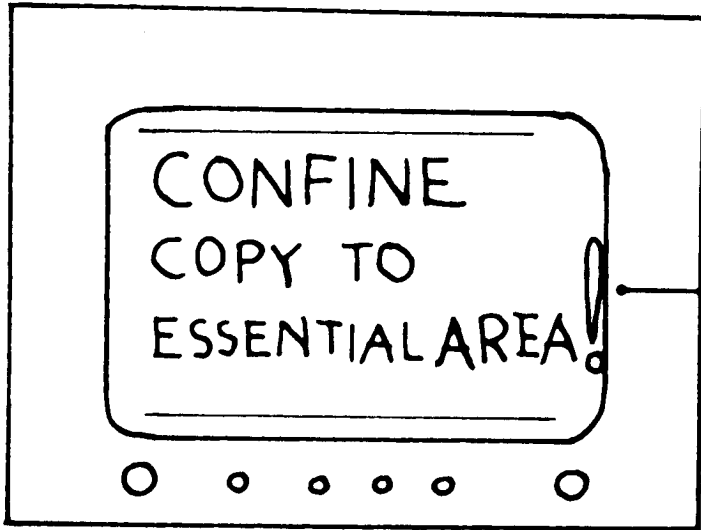
The brightness of a color is basically determined by how much light it reflects. We have already talked about reflectance percentages in our discussion of lighting (Chapter 4). You will remember that the television system is not capable of reproducing pure white (100 per cent reflectance) or pure black (zero per cent reflectance); it can at best reproduce an off-white (of about 70 per cent reflectance) and an off-black (of about 3 per cent reflectance). We call these extremes "TV white" and "TV black." If we now divide the brightness range between TV white and TV black into ten steps, we will have the television gray scale. This gray scale has been closely modeled after the brightness scale by Munsell, a well-known color theorist. Only under the most ideal conditions is the television system capable of differentiating among ten gray-scale steps. A gray scale of seven steps from television white to television black is more realistic. Some production people work with only five gray-scale steps to make sure of reproducing the desired contrast.

Since it takes relatively little reflected light to produce a dark gray or even a medium gray on the television monitor, approximate the middle of the gray scale (step five on a ten-step gray scale, or step four on a seven-step gray scale) does not coincide with the middle of the light reflectance range (50 per cent). In fact, a color with a reflectance of 50 per cent is in the upper ranges of the gray scale, and actually registers as a step two on the ten-step gray scale. A color that reproduces under normal circumstances in the middle ranges of a gray scale usually measures only about 18 per cent reflectance.

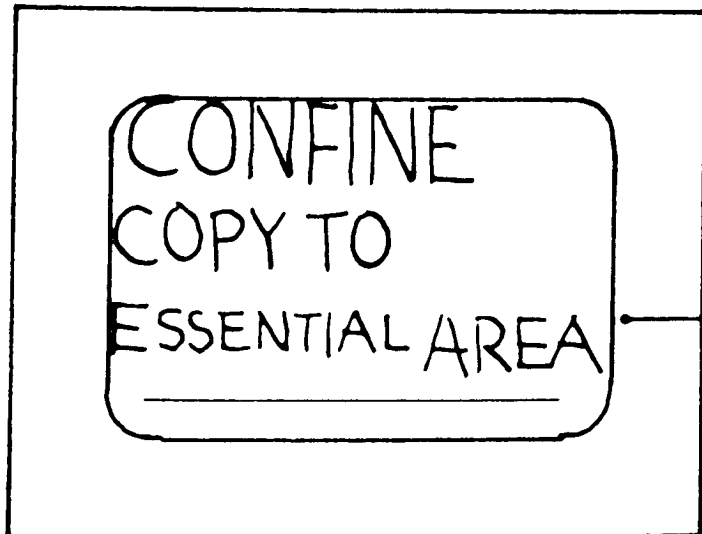
In practice, the gray-scale steps are more common as a unit of measurement than are reflectance percentages. If two very different hues, such as red and green, have the same brightness value, they are clearly discernible on the color monitor; on the monochrome monitor, they will show up as the same gray.



studio card



control room monitor



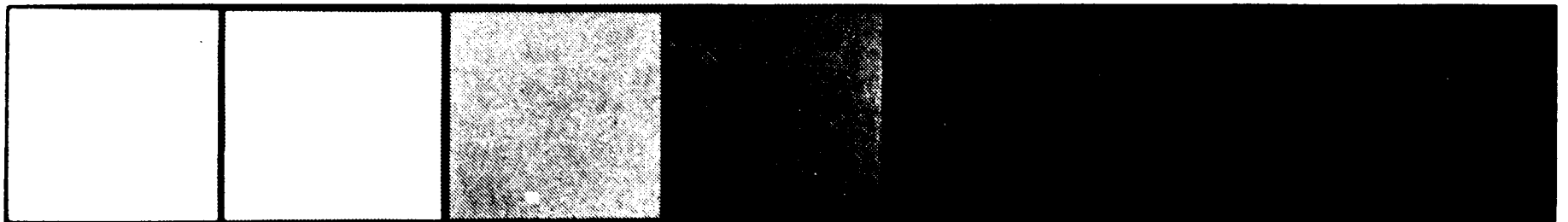
home receiver

the seven-step gray scale

tv white

medium gray

tv black



1

2

3

4

5

6

**the ten-step gray scale**

tv white

tv black



1

2

3

4

5

6

7

8

9

10

70%

50%

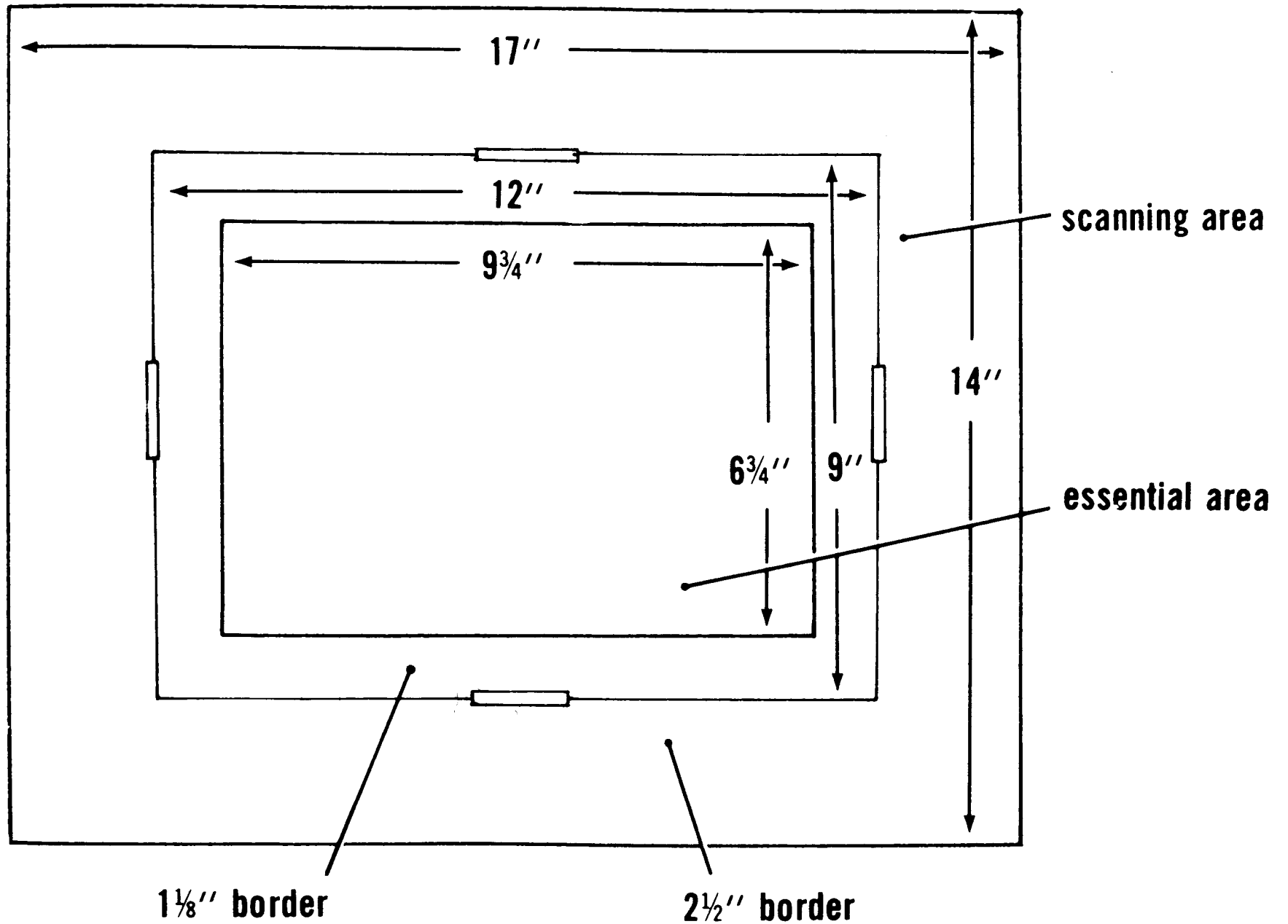
35%

18%

3%

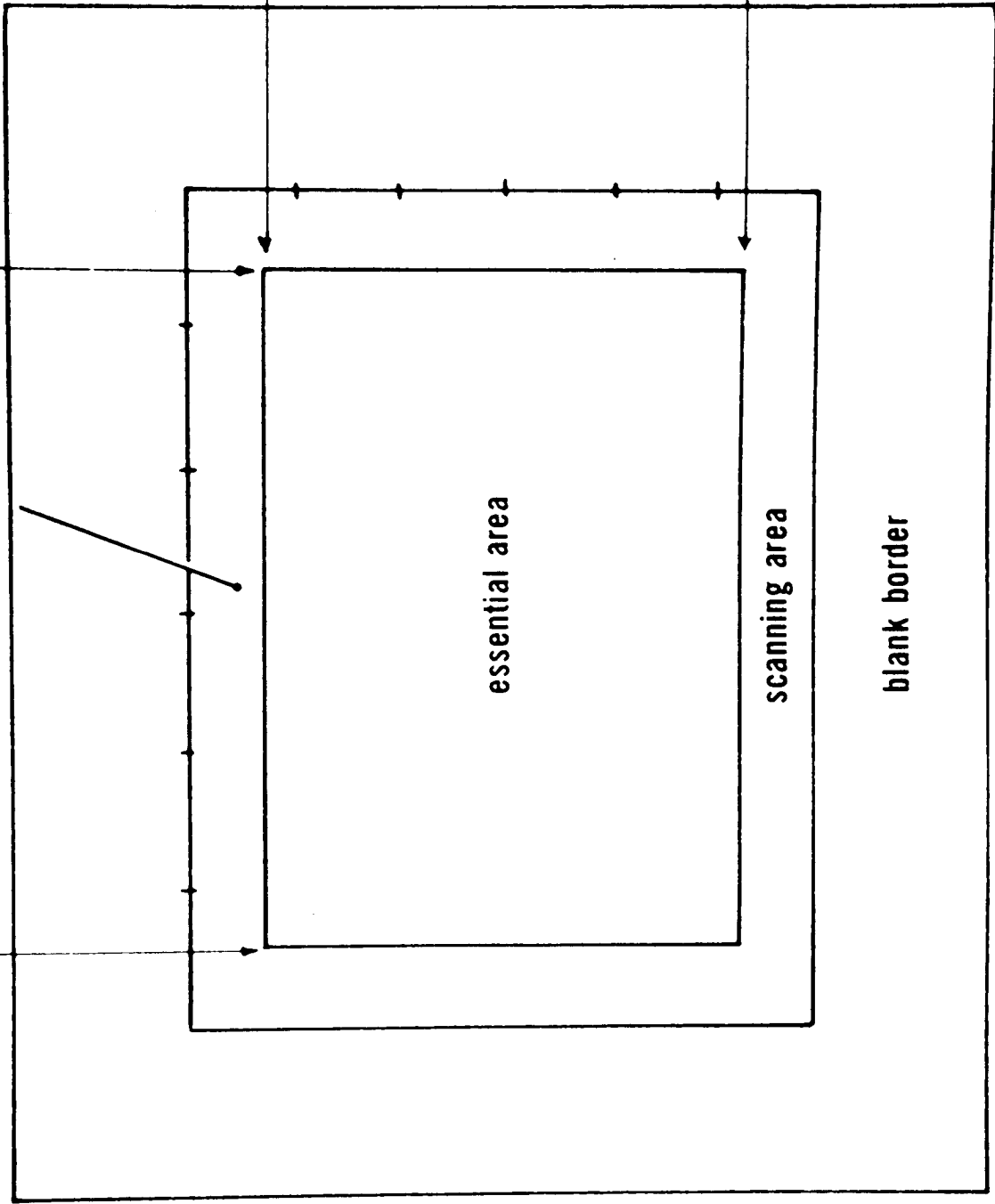
skin tones

reflectance



slightly more than  $\frac{2}{3}$   
of scanning area width

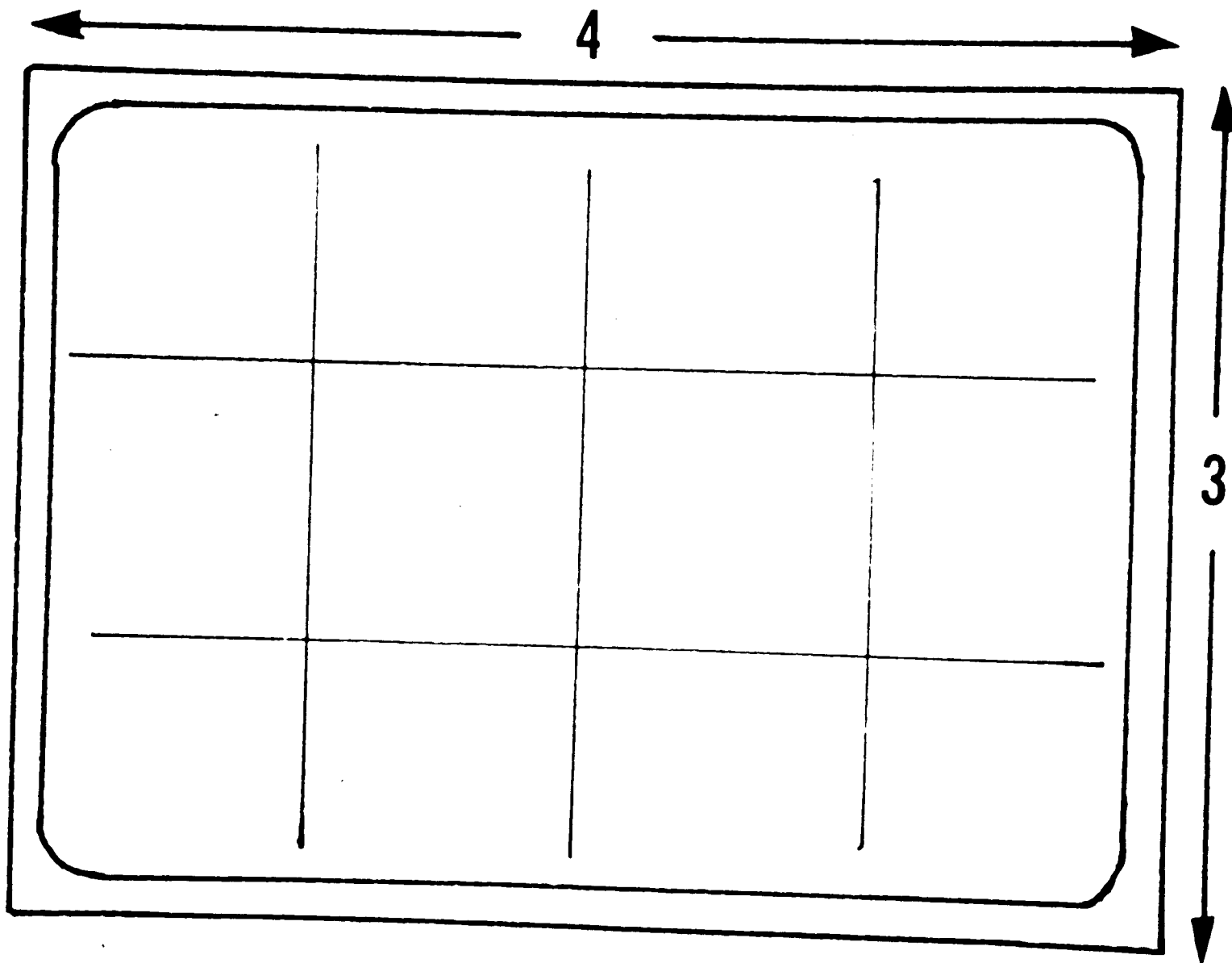
slightly more than  $\frac{2}{3}$   
of scanning area height



essential area

scanning area

blank border



## VISUALS

Television is a visual medium and, as such, the viewer reacts to what he sees as well as what he hears. Many instructional television programs would be just as effective on an intercom system, on sound tape or on an educational radio station. A successful television lesson must take advantage of the visual capabilities of the television medium.

There are three characteristics of the television system which must be considered when visual material is prepared. The first is the "aspect ratio" of the television picture, the second is the limited contrast range that can be transmitted and the third is the limited ability of the system to "see" small detail.

### THE ASPECT RATIO

The aspect ratio of the television picture is 3 by 4; 3 units high by 4 units wide. Transmission of a picture that is higher than it is wide is quite difficult. Wherever possible, artwork, pictures and other visuals should conform to the 3 by 4 aspect ratio of the television frame.

### LIMITED CONTRAST RANGE

The television system can handle only a limited contrast range shown on the screen as shades of grey. In black and white television, grey tones must be in steps of density adequate to provide clear contrast. The television system is limited to a contrast range of 20 to 1. This limitation becomes more meaningful when it is realized that the contrast range of the world around you might exceed 100 to 1. Studio sets and artwork, therefore, should be designed within the television system contrast range.

Mid-range tones reproduce best in the television system. Extremes of contrast such as black printing on white cards or very light colors on a dark background should be avoided. Contrast in a television picture does enhance quality, but it should be held to moderate limits.

In reality, the television picture is not a picture at all. Instead, it is one continuous line of light which crosses the television picture screen so fast it appears as a series of lines that seem to fit together to make a picture.

It can be compared to spraying a fence with a hose. Say that you start at the top left edge of the fence spraying a thin line of water all along the length of the fence. Then you start at the left again, spraying the second "line" just below the top line; then the third line, the fourth line and so on. If you were able to move the hose fast enough, you could completely finish spraying the line at the bottom of the fence before the top line dried.

In television, the idea is much the same. The brightness of the first line (at the top of the picture tube) is retained on the screen even after the continuous light has completed the 525th line across the bottom of the picture. All 525 lines in every television picture are "sprayed" onto the picture tube in just 1/30th of a second. This time is broken into two segments called fields; each 1/60th of a second in duration.



In the first field, the odd numbered lines are sprayed: one, three five and so on through 525. With the second field - the remaining 1/60th of a second - the even lines are filled in: two, four, six through 524. Both sprayings are called one television frame and, as mentioned previously, total 525 lines and take 1/30th of a second. The scanning is called inter-lace.

The 525 lines that make the television picture present a variety of shades of grey from white to black. That's because the white powder painted onto the inside of the picture tube gives off different amounts of light according to the electrical strength of the spray. These differences in electrical force are created in the television camera. A special material in the camera tube "sees" the different shades of light in the television studio. The material changes that light into an electrical charge. When the light it sees is bright, the electrical charge is stronger than when the light is dim. These varying charges travel along a wire through the control circuitry to the transmitter and are sent through the air as a radio wave to the television receiver.

#### LIMITED ABILITY TO SEE

Since the television picture is made up of individual horizontal lines, it is limited in resolution and can reproduce only a reasonable amount of detail. Very thin lines on drawings or patterns of dots will not be seen clearly on the television receiver screen. Here are some guidelines for making and using visuals to supplement the lesson.

Studio cards containing titles, words to be defined, charts, art and photographs, are the most common visuals used in the television studio. A standard size card should be used for this type of material. The most convenient is the 11 by 14 inch size.

Art work and titles should conform to the 3 by 4 aspect ratio of the television system. They should fall within the "safe title area". In this case, allow about 10% free border area on all four sides of the scanned picture keeping in mind that there will be an additional picture loss at the corners. As with the "safe information area" mentioned previously, this is because of the rounded corners found on the typical television receiver. Paying heed to the safe title area will ensure that all of your title can be viewed on the classroom receiver with adequate spacing at the corners and edges.

Because of the contrast and resolution limitations of the system, studio cards should be simple and bold. Information in the art work should be limited to that which is essential to the message. Complex line detail and salt-and-pepper textures will create a "busy" visual which will distract from the television picture.

Engineers use a standard grey scale for setting up and checking the television system. This card contains ten steps of grey from television black to television white. One school of thought is to make use of ten corresponding shades of grey for television art work. While possibly artistically drab to work in, the pictures produced are quite acceptable. It is also possible to check various colors against the grey scale with the television camera. A yellow may correspond to a light #2 grey while a deep blue may correspond to

the dark, #8 grey. Color combinations which look good to the eye may not have the proper grey-scale contrast for easy definition on the monochrome television-system. Colors intended for use should be checked "on camera" to evaluate their monochrome definition.

All studio cards should make use of a limited number of brightness values. Let us again emphasize that, except for special cases, extreme white on a black background or black on a white background should be avoided. Most artwork should appear in the mid-grey range on the receiver.

Studio cards may be hand lettered, printed, or prepared with press-on lettering. Three or four lines of letters should be maximum for use on any studio card and the letter height should be no less than about 1/6 the height of the safe title area. Glossy surfaced pictures and cards should be avoided if possible as glare from studio lights can become a problem. Commercially available sprays that dull the surface can be used to reduce glare.