

VIDEO TAPE CASSETTE DUBBING  
AND OPERATIONAL IMPROVEMENTS

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In June 1976 the NCTA formed a 3/4" Video Cassette Subcommittee to study the problems of VTR operations and to make recommendations and write standards. This paper will briefly touch on the VTR's history in CATV and will preview the standard and recommendations expected from the committee.

Manufacturers responded to the problems and continued to improve their products and today we have a simplified 3/4" video cassette machine that provides reliable service and good signal-to-noise performance.

The major problems have now shifted to dubbing quality and operational control.

In June 1976 the NCTA formed a 3/4" Video Cassette Subcommittee to study the problems of VTR operations and to make recommendations and write standards. The committee is staffed by seven experienced engineers chosen from operating CATV companies, program suppliers and tape dubbing companies. The committee has met a number of times and has defined the problems and is busy seeking solutions, and writing standards and recommendations. Since the committee is not yet ready to publish its material the remainder of this paper will explain the quality control and operating procedures now in effect at Cox Cable Communications.

Video tape recording and playback machines have been in CATV operations in significant numbers only about 10 years. The first ones used were 1/2" reel-to-reel machines made for playback into video monitors. The video response and signal-to-noise performance was poor, the machines stretched and tore the tape, and they typically spent more time on the repair bench than they did in service.

While our early experiences were frustrating, they were also educational, and we soon developed a list of improvements that would have to be made if VTR's were to gain widespread use in cable television. The major improvements on the list were:

1. Improved recording and playback quality, primarily in the area of signal-to-noise performance.
2. Simplified operations and maintenance.
3. Improved quality tapes.
4. Reduced costs of machines and tape.

Inventory control of incoming tapes is of utmost importance. Immediately upon receipt the tapes should be delivered to the control room to be stored for a minimum of 24 hours to allow temperature and humidity stabilization in a controlled environment. The tapes should then be played according to an established procedure and compared to an established standard. Any problem found in tape quality should be reported immediately to the dubbing company. Sometimes this report is only to alert them to a quality control problem, but other times it may be necessary to ask for a replacement tape.

Cox Cable has a minimum test analysis using only a waveform monitor and a video monitor. The figure of merit is arrived at on a comparative basis using a Sony video alignment tape as the reference. This checks the operation of the playback unit and provides a measurement of quality available even to the smallest operation.

The most critical factors on any video signal are the proper levels of white peaks, black peaks, sync tips, and burst.

These can be noted by simply viewing the overall signal on the waveform monitor. This leaves the problems of blanking noise and chroma level or color saturation noise. Excessive blanking noise shows up on the video monitor as a form of horizontal, multi-colored, segmented lines which might be referred to as snow or glitches in the pure video picture. Excessive chroma level manifests itself in the amount of color in an object which can be taken to a point where the object loses its contrast and shape and becomes a brightly colored blob.

The chroma and blanking levels can be measured on a waveform monitor, hence we can perform the tests for comparison.

At the start of the test each tape should be run fast forward and then through rewind to release tension on the tape.

Chroma Level: Set the response switch to the chroma position and the sweep switch to the 2H position. Make note of the maximum chroma information reading, that is, the information above the blanking level. Take readings from five different places on the reference tape and obtain an average to be compared with similar readings taken on the tape under test.

Blanking Noise: Set the response switch to the flat position and the sweep switch to the 1U Sec./Div. position. Using the vertical position control, place the lower limits of the blanking line on the blanking line indicator. Take the measurement for the maximum total width of the overall blanking pulse shown in the trace. To determine voltage use the IRE scale on the scope face for amplitude readings and convert to voltage by multiplying the IRE scale number by .00714. This gives a peak-to-peak voltage reading.

After taking the necessary readings, determine the dB merit figure through the formula:

$$M = 20 \log E_t/E_r$$

$E_t$  = Test tape voltage reading.  
 $E_r$  = Reference tape voltage reading.

A merit figure of 1.5 dB or less is considered good and anything over 2.0 dB is unacceptable.

The results of the above tests performed with only a waveform monitor and a video monitor will aid in explaining problems to the dubbing company. When the results are acceptable they should be recorded and filed. When unacceptable,

the reasons must be communicated to the dubbing company and a new dub ordered for immediate shipment.

The best of tapes and the best of equipment will provide quality programming only when proper operating procedures are observed. The following is a brief summary of Cox Cable control room operating procedures.

#### 1. General Rules.

- a. No smoking, drinking, or eating in the control room.
- b. No unauthorized personnel in the control room.
- c. Operation and maintenance of the equipment shall be performed only by those technically qualified and authorized to do so.
- d. The operator shall maintain the general cleanliness of the control room.

#### 2. Equipment.

- a. Only minor maintenance will be performed by the operator. If a major problem arises the operator shall immediately notify the video engineer or other personnel authorized to perform the required maintenance.
- b. The tape heads, guides, and rollers shall be cleaned after each tape is played and before the start of each telecasting day.

#### 3. Video Tape.

- a. All video tapes shall be stored in a lockable cabinet in the control room.
- b. All shipping and receiving of video tapes shall be handled by a designated member of the control room staff.
- c. No video tapes other than those specified for telecast shall be allowed in the control room at any time.
- d. Any prospective outside tapes that are to be previewed for possible telecast must have the approval of management before being brought into the control room for viewing.

#### 4. Operations.

- a. All telecasts shall follow a standard format and shall be subject to a written log to be maintained by the operator on duty.
- b. Corrections on the log shall be made by the operator on duty. The operator making the corrections shall strike through the original entry, write out the change information and initial and date the entry.
- c. A discrepancy report shall be maintained by the operator on duty. This will record any irregularity, whether caused by equipment malfunction or operator error. It shall be written at the time of the discrepancy and shall report the event being telecast, the nature of the irregularity and what was done to correct it. The operator shall then sign and date the entry.

The two final areas of needed improvement go beyond the control of the operator or the dubbing company, all the way back to the film producer.

Until very recently the dubbing companies received from the producer only theatrical prints for transfer to video tape. The contrast ratio of the theatrical print is greater than can be reproduced on video tape. When the light parameters are compressed to meet the limits of video tape, black picture detail is lost. Even with black stretch circuits the black areas of a scene produce black chroma noise on the subscriber's TV screen. Some producers now supply companies with flash prints. The process of flash printing decreases overall film density. The light shift in the transfer of the film from the theatrical print to the flash print enhances black detail while compressing some white detail. This process is usually a single setting correction of the entire film and gives an overexposed look to the lighter scenes. The flash print, even with the overexposed lighter scenes, is a great improvement over the theatrical print.

Many scenes filmed for theatre viewing lose impact or artistic value when cropped for television's 4 to 3 aspect ratio. Film producers and directors need to recognize the differences in the two mediums and stage the scenes for acceptability to both. In rare cases where this is not possible the same scene should be

filmed separately for each medium. Finally, credits should be positioned so as not to be lost in cropping or should be filmed separately for the television print.