DML Guide to DV Tape

Tips for Handling DV and DAT Tapes

The cautions for handling digital video tape are pretty much the same as for any video or audio tape:

Do not touch the tape itself. Oil from fingers can damage tape.

Do not expose the tape to strong magnetic fields. That means: don’t put the tape on top of a TV, monitor or speaker (they all emit magnetic fields); keep it away from magnetized screwdrivers, and of course, away from bulk tape erasers unless you really want to delete all contents.

Do not leave tapes in your car, especially in the sun.

If the cassette is cold, let it warm up for at least 2 hours before using. Coming from cold outdoors to warm indoors, put the tape in a Zip-Lok plastic bag, and seal it tight. Any condensation formed in the warming process will cling to the outside of the bag, not the tape.

When using tapes in hot, humid or dusty locations, store them in plastic bags, out of the sun.

Do not leave the cassette in your camcorder for longer than necessary.

Keep the cassette in its case, to protect it from dust and dirt.

Tapes that are moist with humidity will shut down the equipment.

12 things to know about DV:

1. Buy Sony-brand tape.

We have had problems mixing tape brands in our decks and cameras. Mixing brands seems to clog the video heads and often leads to dropouts on your tape. Therefore we have standardized on Sony tape.

2. Buy the kind without “the chip”

Sony sells two kinds of DV tape (not counting DVCAM, see below): one with an embedded memory chip and one without it, which is substantially cheaper. Don’t buy the kind with the chip; it serves no function with our equipment.

3. DV and DVCAM, what’s the difference?

Both use the same compression/decompression scheme, or “codec,” so the picture quality is identical. Furthermore, the cassettes are interchangeable. It’s likely that DVCAM tape stock is subject to more rigorous quality testing than DV tape, which would have no effect on picture quality, but might mean fewer dropouts. There are 3 main differences: audio lock, track width, and timecode:

Audio Lock - DVCAM’s audio is tightly locked to the video signal. Since miniDV was designed as a consumer format, unlocked audio was allowed as a cost-saving measure. In unlocked audio, the audio clock is allowed some imprecision, such that there can be a variation from the locked spec of up to +/- 25 audio samples written to tape for every frame, instead of a precise and exact number. It’s the difference between walking a dog on a short leather leash, always forcing the dog to stay right by your side (locked audio), and using a long, elastic leash or one of those “retractable clothesline” leashes that allows the dog to run ahead a bit or lag behind (unlocked audio). In either case both you and the dog will get where you’re going at the same time, but along the way the “unlocked” dog has a bit more freedom to deviate from your exact walking pace.

Track Width - In miniDV, the tracks are 10 microns wide (technically called “track pitch”). In DVCAM, the tracks are 15 microns wide. The idea is that by having wider tracks, DVCAM tapes are less likely to have dropouts.

Timecode - DVCAM incorporates true SMPTE timecode rather than the ABS (absolute time code) used in miniDV.

However, all of this comes at a cost. To achieve locked audio, DVCAM cameras and recorders are more expensive than their miniDV counterparts. To achieve wider tracks, DVCAM uses tape faster than miniDV. DVCAM decks record at a 50% faster tape speed. For example, a mini-size cassette that lasts 60 minutes in a DV recorder will last 40 minutes in a DVCAM recorder.

Most RTF cameras (Canon XL-1, Optura, and Sony VX-1000) record in miniDV format (regardless of which type of tape is used) except the Sony PD-150, which is switchable between DV and DVCAM recording via a menu setting. All RTF decks can play back DV format, and most (except the JVC BR-600U) can play back DVCAM format. For recording, the DSR-80 and DSR-40 record only in DVCAM mode (remember, regardless of tape stock!), whereas others record only in DV mode (DHR-1000, any JVC deck); the Sony DSR-11 is switchable between DV and DVCAM recording via a menu setting.

4. Don’t use EP mode.

Very few of our decks can play back tapes recorded in “EP” (a.k.a. “LP”) mode, the extended-play speed that squeezes 90 minutes onto a 60-minute tape. Dropouts are also an increased problem at this speed. Recording speed is set in the camera menu.

5. Don’t use 16:9 (widescreen) mode.
Unless you know what you’re doing, that is. This isn’t exactly “widescreen,” it’s a trick, a digital simulation of the old anamorphic film formats (Cinemascope, and so on) which squeezed the image horizontally during shooting, then unsqueezed it during projection. But since the camera’s CCD is still just 4:3, and the NTSC DV format is still just 720x486 pixels, you’re actually sacrificing picture resolution to accomplish this trick. Viewed on a normal TV monitor, footage shot in 16:9 mode will look horizontally squished. Editing software (such as Final Cut Pro) can generally display this footage properly on the computer screen, and certain professional monitors have a switch to display 16:9 footage correctly as well, but you’ll need to squeeze it vertically (adding black bars above and below) and then render it before you can record it to tape in its proper aspect ratio.

6. What’s “movie mode”?

Also known as “frame mode” or “progressive mode” on some cameras. Instead of capturing 60 interlaced fields (of 240 lines each) per second, like normal NTSC video, a progressive-scanning camera captures 30 complete frames (all 480 lines at once) per second. Some feel the result is more “film-like,” others that it is too “strobey.” Don’t use it unless you’ve tried it out and seen the results. Also be aware that, if you are planning a video-to-film transfer at any point, at the moment most such facilities recommend not using progressive-scanned NTSC, because of the loss of temporal resolution. It would be a very good idea to actually speak to a tape-to-film transfer house before you shoot.

7. How to record color bars.

Always record 30 seconds or so of color bars on the head of each tape before shooting. On the Canon XL-1, put the camera in Full Auto mode (green rectangle) and press both shutter buttons together for 5 seconds. On the Sony VX-1000, hold PHOTO and the START/STOP button while turning the camera on. On the PD-150, look in the menus.

8. Don’t leave gaps during recording.

In other words, whenever you rewind the camera to view previous takes, be sure to start recording at least slightly before where the last shot ended! If the camera “sees” blank tape when it starts recording, it will reset its timecode to 00:00:00 and make your life hell in postproduction.

9. Treat every timecode reset as a “new tape.”

If the previous warning came too late, and your tape does contain places where the timecode resets to 00:00:00, it’s very important when logging or digitizing in the Avid to treat each section of the tape after a reset as if it were a separate tape altogether. In other words, press New Tape and name each “virtual tape” something like “Tape 1-A,” “Tape 1-B,” etc. This way no “virtual tape” ever contains duplicate time code numbers, and when the Avid prompts you to insert a certain “virtual tape” during a batch digitize, you’ll be able to easily cue up that particular section on your “real” tapes.

10. Black Your Tapes

We highly recommend that you black all tapes prior to shooting. Doing so lays down continuous time code, protecting you from the TC resets described in #8; and it can help shake loose dust and detritus left over from manufacturing, slightly reducing the risk of dropouts during critical recording. To black a tape, simply press RECORD with the lens cap on, and let the tape run to the end.

11. Symptoms of a head clog.

The video head might be clogged if: A) the screen is divided into large squares, some of which appear freeze-framed, or B) half the screen is frozen, while half plays, or C) the tape is playing back at the wrong speed (too fast) and the words NOT EDITABLE do not appear on the front-panel display. (A mini-DV format tape in a DVCAM machine should always indicate NOT EDITABLE.) Ask a proctor or TA for a head-cleaning cassette.


While manufacturers claim that miniDV is more robust and less prone to dropouts than its similarly tiny forebear, Hi-8, they still do occur. There are two approaches you can take to protect your irreplaceable master tapes. One is to minimize logging “wear” by capturing your footage in large chunks, or even an entire tape at a time; then the process of sub-clipping those master clips becomes your logging process, and your tapes aren’t being shuttled back and forth again and again for logging and batch-capturing lots of small clips. The other is to make “clones” of your master tapes (identical digital copies) onto another set of DV tapes. Unfortunately, while all DV decks can accept a Firewire signal from another DV deck (or camera) and make a perfect copy, very few can also duplicate the source tape’s time code — instead they lay down new time code starting at 0:00, just like a camera. The CMA 4.206E lab has a cloning station set up which allows you to clone DV tapes choosing to keep the original time code or lay down new time code (for example if you have a lot of timecode breaks).