

Endangered Archives Programme

Guidelines for video preservation

Video and audio collections have similar preservation issues, namely preservation of the carrier itself, and preservation and maintenance of the means of playback. Whilst audio preservation has gradually evolved some base standards from which to build a framework for preservation, video is still in a state of flux, due to the complexity of the signal, various different worldwide standards, and the still changing nature of digital technology.

Preservation and Conservation

Video tapes from the 1960s have all the problems of audio tapes – acetate bases, sticky shed syndrome, white powder mould, etc. Video machines were also a comparative rarity and so expensive that only broadcasters used them. Few of these early machines are still available now.

Preserving video recordings involves first deciding on a suitable destination format – digital tape or file-based. The format must be able to support the video standard in question – PAL, NTSC or SECAM, as it is very important not to introduce any of the artifacts caused by standards conversion at this stage. The connection from player to recorder must also allow for the best possible signal format, be it composite, S-video, component or digital. The player must be set up and calibrated as well as is possible, given current technologies. Any problems in the recording, such as mis-tracking, skew etc, need to be compensated for as far as is possible. Sometimes this may involve mechanically or electrically mis-aligning a machine in order to extract the best possible signal from the tape, for the video and however many audio tracks may exist. It is important to verify the audio track configuration on the tape (longitudinal, hi-fi, digital, etc) and use the correct player for this. Where more than two tracks exist, this may inform the destination format decision.

In choosing a format for preservation, the two major considerations are the quality of the signal (picture and sound) and the likely continuing availability of playback equipment. From these criteria, it is possible to select some main contenders.

DVD-Video

Starting with the cheapest and lowest quality, a format which is very widely accepted and is likely to be supported a long time into the future, with both software and hardware players, is DVD-Video. Based on the 4.7GB optical DVD disk, the system uses a tightly controlled format specified by the DVD Forum (www.dvdforum.org/). The pictures are heavily compressed, usually in MPEG2, and audio may be uncompressed or use the Dolby Digital compressed format. Recorders are readily available, as are blank optical media, though the quality of these must be rigorously controlled to maximise the interchange capabilities and shelf life of the disks. However, optical media must still be regarded as one of the least stable of the available carriers, and multiple copies should be made on different stock, in an effort to forestall future playback problems. A very low-cost (and quality) option for transferring VHS video is to use a single machine with VHS player and DVD recorder built-in.

DV / DVCAM / DVCPRO

The Consumer DV format is probably the most widely available affordable digital video format. The higher quality variants, DVCAM and DVCPRO are supported solely by their respective manufacturers, Sony and Panasonic. All three systems have the same

compression ratio, 5:1, but the higher relative tape speeds of the latter two make them more suitable for archiving. If a linear tape format with light compression is preferred to other file-based formats, DV is a useful option. Various hardware and software is available for converting tape-based picture and sound to other file-based formats when required.

Digital Betacam

'Digibeta' is still the archive format of choice for many video and film archives. Although the machines are expensive, at around £16,000, they are very robust and also very common throughout the broadcast industry, so spares and support for playback should be available for some time to come. First generation machines are no longer manufactured, but Sony have designed all their formats for the past 20 years around the same cassette profile, so many newer format machines are also able to play back Digital Betacam tapes. However, suitable recording machines may be becoming scarce, as broadcasters and Sony phase out the format. In addition, special options are needed in order to record from older analogue formats, such as VHS.

Digital File-based archiving

The next stage is migration from videotape to digital file-based storage, as with audio. However, in its raw, uncompressed state, 50 seconds will use up 1GB of storage. While storage costs continue to fall, the data management and continuous migration needed for a large video collection is still a formidable task.

One solution is to use compression, as is used for nearly all digital video tape. MPEG is a very efficient form of compression, used in many areas. However, the picture quality can deteriorate when MPEG-type compression and decompression is cascaded. This may become necessary at any time in the future as an archive discovers that its chosen compression format is becoming moribund.

The archiving community is, therefore, approaching compression very carefully, in the hope of choosing a format in which to store the video signal which will not need to be changed in the foreseeable future. The most likely standard is JPEG2000 compression with MXF file format, which can be 'lossless', avoiding the problems of MPEG, with several other advantages. It's still in its early stages and is not so far being taken up widely in the TV industry, although it has been adopted for digital cinema. There are still very few manufacturers providing expensive equipment supporting the format.

Born Digital Archiving

Assets which only exist now in a digital form, such as VCD, DVD-Video, Quicktime or other video file formats on CD, DVD or other older disk formats need transferring in their native state to some more stable data format. The files should not be altered in any way but should be copied to another medium, such as hard drive or data tape. Very often, however, material may have arrived at this format via a tape-based camera, or tape-based production master, and wherever possible these should be sought out and preserved, as well as the file-based assets.

Summary of possible archive formats

DVD-Video

Advantages

- Cheap.
- Reasonable picture quality.
- Good compatibility.
- Widely available low-cost equipment.

Disadvantages

- Optical media has many quality problems and uncertain shelf life.
- Video and usually also audio is compressed.
- MPEG compression is problematic.
- Quality thus lost is never subsequently recoverable.
- Semi-professional, rather than domestic recorders are preferred for archiving, which are not so plentiful.

DV / DVCAM / DVCPRO

Advantages

- Cheap, well-proven tape-based format.
- Relatively light 5:1 video compression and no audio compression.
- Abundance of equipment to transfer tapes digitally to file-based formats or DVD-Video.

Disadvantages

- 'Professional' upgrades – DVCAM and DVCPRO are single manufacturer-based.
- Tape storage conditions are critical for longevity.
- Migration to file-based formats will still be required before the format becomes obsolete.

Digital Betacam

Advantages

- Abundance of and support for playback equipment.
- Least compressed of the common video formats.
- Four 20-bit audio tracks available for transfer of longitudinal and HiFi audio tracks if required.
- Common worldwide archiving format .
- Worldwide solution likely to become available for migration .

Disadvantages

- Relatively expensive.
- Tape storage conditions are critical for longevity.
- Migration to file-based formats will still be required before the format becomes obsolete.

File-based archiving

Advantages

- Once-and-for-all transfer possible.
- Very high quality (losslessly compressed) images and sound are possible.
- Metadata standards are being developed to allow sophisticated cataloguing.

Disadvantages

- Standards are still in flux.
- Most expensive solution.
- Very little equipment as yet available.
- High skill levels required to deal with.
- Active data storage and migration policies must be developed and operated, at some cost.