



## The production process – Mastering and archiving

In an analogue videotape editing process each video or audio clip is selected and copied from a player VTR to a recorder VTR.



*Mastering on Betacam SP*

The tape in the recorder becomes the master tape for the production, from which broadcast release masters and VHS copies may later be taken.

The master tape is an important archival resource - we produced at least one master tape of each production - even those edited and archived digitally.

In the non-linear digital editing process, the raw material is copied (digitised) to the hard drive storage medium, and the editing process is simply a task of building a timeline script to get the editing computer to play the required parts of the required clips in the required order - without apparent interruption or delay.

Such playback does not require a master tape with its own edited copy of the original clips. The digital master is simply a virtual playback script.

The digital and analogue output from a non-linear editing computer is usually of a much higher resolution, or a different data format, than that required for broadcast or distribution.

When the editing process is completed, the production must be digitally encoded into the necessary formats for distribution on tape, network, CD, DVD or internet.

This work - first undertaken when the production has been approved - comprises the following tasks -

- A 33 megabit or 50 megabit "fused sequence" digital master file is created (this file can only be played back on the editing computer)
- The digital master file is copied to the required professional analogue or digital videotape formats which will be used for broadcast release, videotape duplication and archiving.
- VHS copies are pulled from either the digital master file or videotape
- The necessary files for DVD authoring are encoded from the digital master file
- Files required for CD or web release are encoded from the digital master file
- Where relevant, web-compatible low bandwidth files are encoded for client screening via the Channel 6 Television web server.

Both the digital master file and subsequent encoded files and videotape copies are subjected to a critical quality control to ensure that release copies derived from these are of the highest possible quality.

These files are also backed up and archived for future applications such as duplication, production updates and language versioning; all of which could be required many months or years after the original production is completed.

Similarly, all production data - digital graphics, music, narration, audio recordings, the edit lists for the project and all relevant administrative data relating to the production is copied from the company's active servers to both back-up servers and retrievable media.

Safety copies of Video CD or DVD releases are also made and archived.



## Archive considerations

The original raw video, audio or film recordings are held as a physical archive.



*Channel 6 Television's master archive*

Although archiving on hard drive may be economically viable for all production footage in the future, current storage technology remains too expensive and requires video compression that may - in the light of future digital technology - prove inferior when compared to re-digitising from the original recording. Therefore any subsequent use of the footage will require re-digitisation.

The development of digital video has progressed rapidly in the last decade - giving rise to a multitude of videotape and drive based recording formats, each with its own compression technology. Most of this technology was developed first for standard definition television.

Now, with the advent of wide screen and HDTV, industry professionals are continually faced with the task of reformatting standard definition material, the use of which will be common for many decades to come.

The major issue with digital video recording is one of compression – for the digital cameras, video recorders and processing systems to be able to handle, store and subsequently retrieve and deliver – large amounts of data in real time, most digital video systems involve some form of compression by which part of the original image data is “thrown away” – to reduce the amount of data remaining.

Digital video technology is certainly improving, but the fact remains that the image from any compressed

digital image is constructed from only a part of the image information that originally was available to the camera lens – somewhere along the way, this data has been disposed of to save space and bandwidth.

This is rarely an issue when evaluating the image subjectively at the first generation, because the compression algorithm used to compress the data will usually reproduce the image without subjective loss or artefacts.

When editing such material, the result will usually be of equal quality to the original compressed image – because it is an exact digital copy – providing of course that the editing and copying is undertaken using the same digital format and compression standards as the original. If this is the case, the end result will only have seen one process, in which data has been discarded to achieve compression.

But with today's plethora of differing acquisition, editing, storage, mastering and distribution standards and formats, this is rarely the case.

The same is true of most transitions, effects and rendering in the digital editing process. When two images are combined in a dissolve or transition effect, some data must be discarded.

Simply mixing for example – two 24 bit data streams first results in a 48 bit combination, which must be reduced to 24 bits by “dithering” the least significant bits of data – the precise algorithm for how such dithering is accomplished is different in every proprietary digital processing system.

Many broadcasters have encountered regrettable degradation of the digital image as it passes through many generations of digital compression and videotape recording – each using different digital standards and compression algorithms.

Whilst broadcasters are under considerable economic and technological pressure to embrace each standard as it becomes available, an independent production company such as Channel 6 Television is able to take a longer view, as our only consideration is which formats to use for acquisition and release.

For this reason Channel 6 Television has chosen to retain Betacam SP or equivalent uncompressed digital acquisition technology until the company makes the transition to a high definition widescreen format - to ensure that all media recorded in standard definition remains uncompressed in archive until the needs of the future are determined.