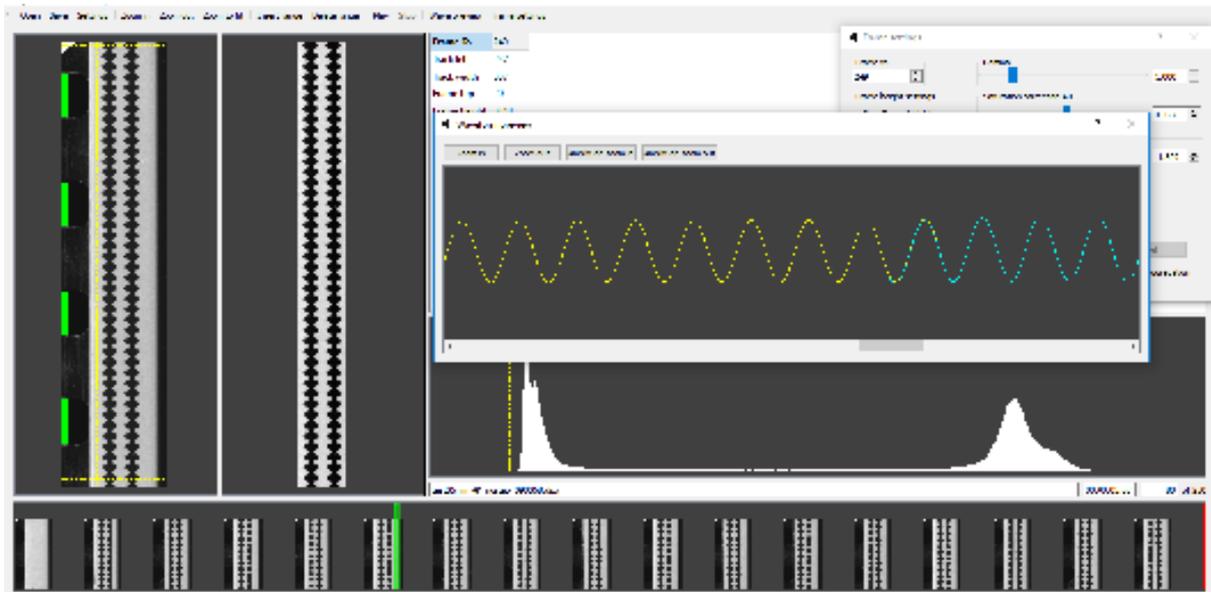


Optical Sound Decoding for Arriscan



IMAGE TO SOUND TOOLS (ITST) is a unique system designed to digitise the optical sound on films. The package of specialized software extracts the optical soundtrack (positive or negative) from the image DPX or TIFF files created in the process of a routine film scanning (both video frames and the soundtrack) and converts it into a digital audio in online or offline modes. Real time processing and on-line playback provides the best parameter adjustment whereas offline mode quickly creates final .WAV files.



The key factor for the sound quality obtained during the processing with the ITST system is the quality of scans. Obviously the high-quality scanning directly translates into sound parameters - resolution is related to sampling frequency, depth of colours to reproduction of amplitude. ARRISCAN creates 4K (up to 6K) RGB files in DPX or TIFF formats, where each colour channel is encoded with a resolution of 10 bits. Keeping 4K resolution, we obtain a sound file with the native sampling frequency of approximately 75 kHz*. It is extremely important for the ITST technology, that the sound track must be scanned with some overlaps which further enables subsequent files matching and obtaining the continuity of sound. If this fails for some reason, the ITST system has an algorithm for levelling the gaps between frames, but this functionality is limited and depends largely on the sound source.

If the scanning process meets the above requirements, the DPX files may become a source material for further restoration works of both image and sound with the ITST system. Scanning parameters are usually selected for the image properties, so ITST is equipped with a suite of tools that improves a sound quality from scans:

- Frames matching algorithms
- Selection of the optimum processing area of soundtrack
- Correction of black/white saturation
- Gamma correction (for negatives films)
- Image filters (median, Gaussian, averaging, etc.)
- Processing algorithms for variable area or density recordings
- Filling soundtrack discontinuities algorithm
- Change the parameters in the "on-line" mode, dividing the material into sections due to the changes of parameters and storing the digitization projects in files.

The biggest advantage of the current version of ITST is the ability to playback audio directly from image files in real time. The audio playback or looped playback allows to set the optimum performance parameters for digitisation in significantly shorter time even when a soundtrack is damaged. The ratio of the real time audio to image-to-audio processing time in offline mode is about 1:0,4 (depending on a hardware platform and number of algorithms involved). This has been achieved primarily through appropriate algorithmisation of processing, as well as the appropriate matching the hardware platform.

* It is also possible to use the scans of different resolution, e.g. 2K – here the sampling frequency will be of course halved. Hence using a lower resolutions should be always previously tested.