



Transferring Old U-matic Video Recordings Without Dropouts

Video tape FM carrier signal levels of old Low-Band U-matic recordings are much lower than that of the more recent High-Band tapes. This problem causes a significant increase of the number of dropouts and other image instabilities at playback¹. We have solved these very visual problems by substantially enhancing the VCR video head pickup system sensitivity.

Analog VCRs are designed to deliver a relatively stable playback image and adequate dropout concealment with tapes having fairly variable video FM carrier signal levels. Old Low-Band tapes, however, may give only about 10 percent of signal compared to High-Band tapes used from the late 1980s. Early U-matic tape formulations are simply not as good at retaining their magnetic signature as their successors. Over time, aged video recordings also suffer from gradual self-demagnetization.

A combination of these losses amounts to serious video tape signal reduction. When only about 10-15 % of the intended signal level is available, standard VCR circuits can no longer provide stable video signal or proper image dropout concealment.

Our solution to this problem was to raise the video playback circuit sensitivity by a factor of 3, without increasing the degree of amplification, as that would unavoidably increase the playback image noise. The 'noiseless' gain brings the RF tape signal to within the nominal range, allowing the video signal demodulator and dropout compensator function, once again, as they were intended.

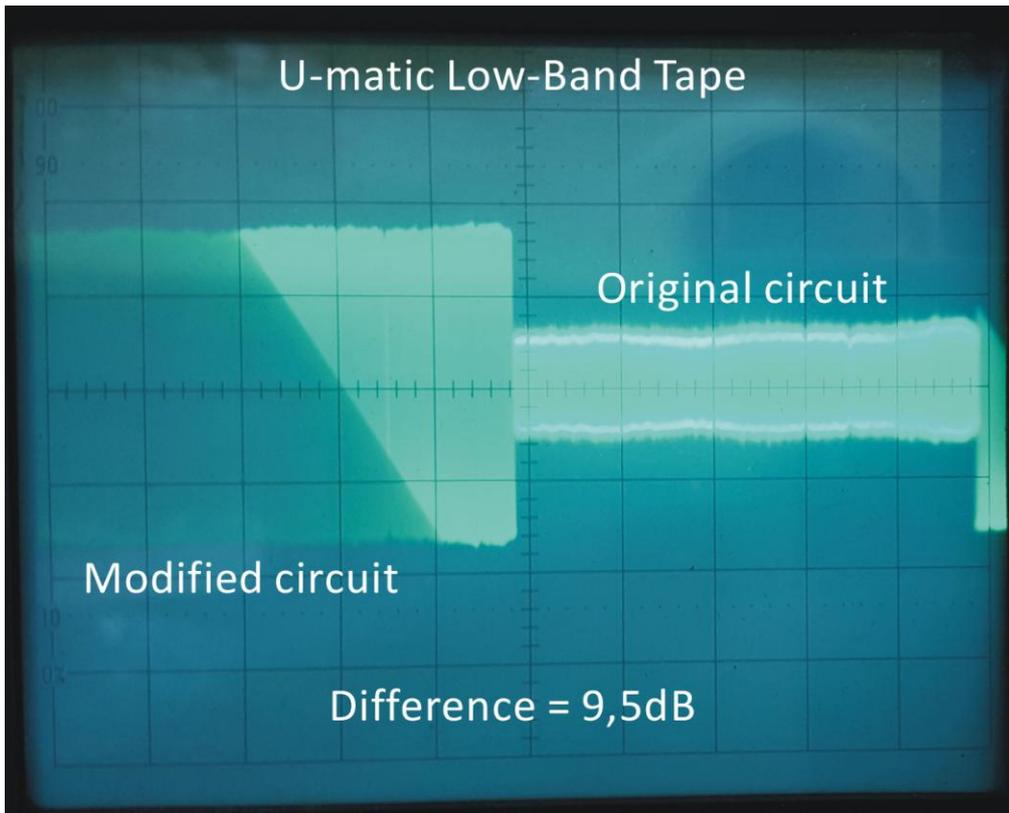


Figure 1. VCR video circuit sensitivity increased by a factor of 3, brings a weakened tape signal back to the proper level for the video signal demodulator and dropout compensator.

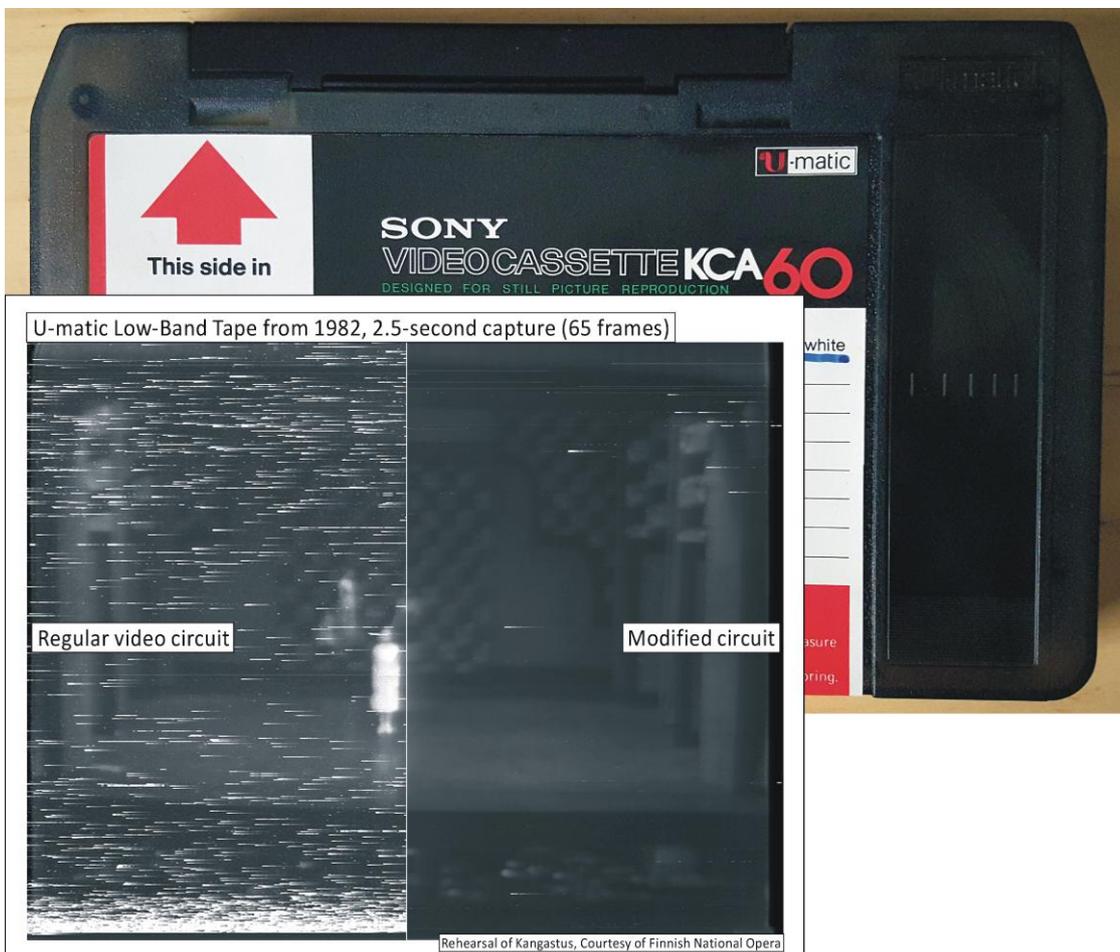


Figure 2. Comparing B/W captures of the same tape segment before and after our circuit modification. The number of dropouts is reduced drastically – by more than 99 %.

The effect of our circuit modification is illustrated in Fig. 2. A sequence of 65 frames (2.5-seconds worth of video footage) is stacked together to show all the individual dropouts cumulatively.

Dropouts or other occasional errors can, of course, be masked or filtered by the capture device, or during the post-processing stage – but not without some loss of image resolution. However, our VCR circuit modification eliminates most dropouts already at the capture stage, greatly expediting and simplifying the overall transfer time of old U-matic video archives.

REFERENCES

¹ Restoring Unstable Color Image of U-matic Video Tapes/DigiOmmel & Co. 2014

Leo Backman/DigiOmmel & Co.

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