

SOURCE : Japan
TITLE : VIDEO SOURCE CLOCK RECOVERY
PURPOSE : Discussion

1. Introduction

Our previous document AVC-336, "Picture Header Modification for Video Source Clock Recovery," proposes a method for video source clock recovery required for high quality realtime video communications.

This document is a supplement to AVC-336, and it discusses some possible problems of the proposed method and clarifies the matters that need further discussions.

2. Brief Review of AVC-336

- Object: To recover the video source clock frequency at an decoder.
- Means:
 - encoder
 - * A video source clock CLK_S is supplied to a counter CNT_S which is cleared with a fixed interval T_{NET} defined by the network clock CLK_{NET} .
 - transmission
 - * The lower N bits (N tentatively being 8 bits) of the counter value VAL_S is transmitted using a field in a Picture Header, which occurs at an interval T_{PH} .
 - decoder
 - * A locally recovered video source clock, CLK_R is supplied to a counter CNT_R which is also cleared with the interval T_{NET} defined by the network clock CLK_{NET} .
 - * The lower N bits of CNT_R , defined as VAL_r , is compared with a received VAL_S , and CLK_R is advanced if $VAL_S \geq VAL_r$, and vice versa.

3. Discussions

- What video source clock
 - Since the input to an encoder is a CCIR Rec. 601 signal, the video source clock frequency of nominally 13.5MHz is a natural selection.

- Network Clock Availability

- The method assumes the availability of common network clock CLK_{NET} to clear the counters CNT_S and CNT_R with the same interval of T_{NET} .
- If the assumption is not true, other methods must be employed, possibly with inferior performance.

- Frequency Information Transmitting Interval

- The method does not require transmitting all VAL_S values, which is generated with an interval T_{NET} . Transmitting (and probably discarding some of) the VAL_S information at a T_{PH} interval is only one realization.

- Retrieval from Digital Storage Media

- A DSM device does not differ from other devices such as a TV camera in a sense that its video source clock must be recovered at a decoder. However, it must be noted that the video source clock that must be recovered is the one used for retrieving the media and not the one used for recording.
- This implies that the digitally duplicated and stored video sequences will need different values as its VAL_S information when they are retrieved at a different site using a different clock.
- This further implies that the Picture Header, or at least the field conveying the VAL_S information must be rewritten each time the video sequence is retrieved.
- The rewriting of the field is necessary, because the video source clock information is conveyed using a Picture Header and retrieval of DSM is equivalent to creating a new video sequence as far as source clock recovery is concerned.
- However, the rewriting can be avoided by always using the (same) network clock for the operation of DSM devices, and by the convention that VAL_S values in such cases to be, e.g., all zeros.

4. Conclusion

A video source clock recovery method is discussed.

References

1. AVC-273, "Clock Recovery For Video", Japan, July 1992
2. AVC-336, "Picture Header Modification for Video Source Clock Recovery", Japan, September 1992