Source : FRANCE

Title : SYNCHRONIZATION AT THE RECEIVER

In the hardware implementation of the flexible codec a very important problem consists in the synchronization of the decoder.

This synchronization includes two main steps :

1/ Recovering the clock frequency of the coder.

2/ Synchronizing the receiving buffer to the transmitting buffer.

This paper describes a very interesting method which allows to implement a synchronized decoder independently of the coder.

In theory, the buffer content at the coder and at the decoder must be exactly the same, this, in order to avoid overflows and underflows and so, loss of informations. In practice, this implies to transmit in the video multiplex the buffer content of the coder and to process it at the input of the decoder in order to obtain the right synchronization of the buffer decoder.

A synchronization processing like this one, based mainly on the transmitted buffer content is quite heavy to implement in hardware and if transmission errors occurs, complementary cares must be taken to avoid losses of synchronization.

As the clock justification is not provided, an other method consists to have an independant buffer at the receiver. Writing of this buffer is performed at the received transmission frequency. Reading and decoding is made at a frequency which can be issued from an independant oscillator - (stability ±50 ppm as recommended in the specifications) -

For such an implementation, the synchronization process can be a very simple one. It needs only to have from time to time at the encoder a temporal subsampling of one frame. This procedure is used in the former videoconference codecs at 1,544 Mbit/s (CCITT recommendation H120 part 2, paragraph 4-1-2-2) for 625,525 lines compatibility.

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For resynchronization, if the buffer content increases too much, the subsampled frame is omitted at the decoder and the previous decoded frame is followed immediately by the next coded frame. This solution allows to avoid overflows at the receiver. If an underflow is about to occur, the previous decoded frame is repeated and the buffer content increases.

In order to allow such a procedure for resynchronizing it is necessary to define for the flexible hardware specification a "minimum temporal subsampling rate" at the encoder. This MTSR could be for example 1/100 which does not introduce any visible impairment (at visualisation) and allows a reasonable decreasing rate for the receiver buffer.

In conclusion, our proposal is to use on the transmission channel always a normal frame rate of 29,97 Hz, but with a maximum coded frame frequency of 29,67 Hz.