CCITT SGXV
Working Party XV/1
Specialists Group for Visual Telephony

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Title: Clock Synchronisation for the H261 p*64kbit/s codec

Source: France, FRG, Greece, Italy, Netherlands, Norway, Sweden, UK

1. Summary

Previous documents presented by the UK and France (see CCITT SGXV/1 documents 293 and 332) described a possible technique which enables video codecs to automatically lock their send and receive network clocks. The method allowed fully duplex video conference connections to behave synchronously, even if the connection was via an asynchronous network. Considering this problem further we now believe that the proposal will fail with some network configurations. Specifically, the method may fail when using proprietary multiplex equipment to source clocks. It is unsatisfactory to include a solution in H.261 which can fail with certain configurations of equipment which individually fully meet CCITT standards. We therefore conclude that the method described in document 293 is not suitable for inclusion in the H.261 standard and recommend that we use some bits in the H.221 framing structure to indicate synchronous/asynchronous working.

2. Brief summary of previous proposal (doc 293)

Document 293 employed a phase locked loop (PLL) in the line system clock generation. The PLL was specified to have a very limited pulling range (+/- 25ppm maximum range, +/- 1ppm minimum range on 2.048MHz nominal). When a video codec is connected to a synchronous network the PLL locks to the highly accurate incoming clock on the receive data path. When two codecs are connected together via an asynchronous network each codec pulls towards the others frequency and eventually locks at a clock frequency within 25ppm of nominal. The problem of asynchronism between codecs was therefore solved and they behaved synchronously even in asychronous environments.

3. The problem

Many private networks use proprietary multiplex equipment to combine telephony, data and video conference services onto a single primary rate link. To enable mixed services to be combined in this way their transmit clocks must be synchronised. In many cases the master clock is in the private network, being derived from the free running clock source in one of the multiplex equipments. In line with CCITT specifications for terminal equipment, the multiplexer network clock frequency specification is +/- 50ppm. Thus many private networks operate synchronously with clock frequencies in the range +/- 50ppm. The technique described in document 293 can, at best, only lock to clock frequencies in the range +/- 25ppm. Video codecs employing the method would therefore fail when operated on some private, synchronously operated networks.

4. Proposal

Use some bits in the H.221 framing to indicate whether the codec is connected to synchronous or asynchronous network. This is similar to the method specified for the H.120 codec.

Note: *It should be noted that there is a problem with interworking of private networks which operate synchronously at clock frequencies in the range +/- 50ppm with other networks which operate with much tighter frequency specifications.*