ITU–T Telecommunication Standardization Sector
Study Group 15
Experts Group for Video Coding and Systems
in ATM and Other Network Environment

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SOURCE : Japan
TITLE : Common Bitrate for H.310 Terminals
PURPOSE : Discussion

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1. Introduction

This document discusses the necessity for defining a common bit rate that is supported by all H.310 terminals.

A single or a set of bit rate(s) should be considered to be mandatory to ensure connectivity, while other rates can also be used as optional, out of which one rate is chosen when both endpoints support and agree to use that rate.

We also suggest that the reference point for the definition of bit rate shall be at the AAL-SAP.

For the previoius discussions on this matter, see Section 8.1.2/AVC-800R and AVC-768.

2. Background

Exact recovery of trasport bitstream rate (eg. 4Mbps or 9Mbps) at a receiver is required for high quality video communications, because stable 27MHz system clock recovery operation can only be expected when PCR values are delivered to a 27MHz PLL circuit with minimum amount of jitters.

Practically, another PLL circuit is employed for the recovery of transport bitstream, and an VCXO (Voltage Controlled Xtal Oscillator) is used in there if one wishes to attain the best results.

One drawback of using a VCXO is that only a set of discrete frequencies can be recovered, and if the two H.310 terminals has VCXOs with different free-run frequencies, it is most likely that they do not have any bit rate that can be used in common.

3. Implementaion Examples

The following table shows some examples of supported frequencies in MHz for different designs of PLL circuit. The list is only to help discussions and not inteded to imply candidate values of a common bit rate. The sparseness of available bit rate for particular implementation may suggest the maximum number of "mandatory" common bit rate for H.310 terminals.

n	MHz	VCXO=12.288MHz	VCXO=17.28MHz	VCXO=54MHz
282	18.048		x	
256	16.384	x		
250	16.000			x
243	15.552		x	
235	15.040		x	
225	14.400			x
192	12.288	x		
188	12.032		x	
162	10.368		x	
150	9.600			x
141	9.024		x	
135	8.640			x
128	8.192	x		
125	8.000			x
96	6.144	x		
94	6.016		x	
90	5.760			x
81	5.184		x	
75	4.800			x
64	4.096	x		
54	3.456			x
50	3.200			x
48	3.072	x		
47	3.008		x	
45	2.880			x
32	2.048	x		
30	1.920			x
27	1.728			x
25	1.600			x
24	1.536	x		
18	1.152			x
16	1.024	x		
15	0.960			x

4. Considerations

The points that should be considered in defining a common bit rate for H.310 terminals are:

1. Range and granurarity of mandatory and/or optional bit rates.
   - The bit rate suppored should well cover typical MP@ML applications with both medium and high qualities.
2. In multiples of 64kbps?

- This alone does not do any harm, but such good numbers may also be preferred at other interface boundaries. In such cases, whether transport stream bit rate should be in multiples of 64kbps must be discussed.
- One such example could be ATM channel service provided over existing STM circuit. After excluding overhead bits for ATMizing, etc., the available bit rate may not fall onto multiples of 64kbps.
  (Example: Out of a 6.144 Mbps STM lin, less than 48/53 x 6.144 = 5.514 Mbps is available, which is 86.94 times 64 kbps.)

3. Where to define common bit rates.

   - Assuming that the common mandatory bit rate(s) must be defined, one still have to choose at which boundary it should be determined. This document suggests defining at the AAL-SAP, which is equal to MPEG-2 transprot stream bit rate, but other ideas could be possible.

4. Locked or not locked.

   - The common bit rate may or may not be locked to 1) the network clock (=155MHz) or 2) the PCR (=27MHz) or 3) the video sampling clock (=13.5MHz).
     (Note: Cases 2) and 3) should be distinguished for optional PS streams.)
     A piece of information suggesting the lock status may be useful if it is included in call initiating protocol.

5. Comment on 27 MHz PCR derived bit rate.

Nominal transport bit rates can be derived from either 155.52 MHz (145 x 5 x 27 x 8 kHz) or 27 MHz (27 x 5 x 27 x 8 kHz) as far as they are multiples of 8 kHz.

An advantage of the 155.52 MHz based bit rates is to utilize the very stable network clock to minimize the transport clock jitter.

An advantage of the 27 MHz based bit rates is to allow a single PLL to recoer both STC and transport clock (hardware verification?).

6. Methods to represent optional bit rates for H.245 capability messages.

Two possible methods are: 1) to indicate a maximum value if any values (in multiples of 64 kbps?) below the maximum are supported, 2) to enumerate all the bitrates the terminal supports.

The current H.245 specifications include one value in form of integer (0 – 65535) in units of 64 kbps which indicates the maximum bit rate capability for the VC.

7. Conclusion

This document discussed the necessity for defining a common transport bitstream rate that is supported for all H.310 terminals.

END