CCITT Study Group XV
Working Party XV/1
Specialists Group on Coding for Visual Telephony

Document # 147

Title: Bit pattern for PSC and GBSC

Source: UK

Document #122 of CCITT Study Group XV/1 proposed a VLC code table for the nx384kbits/s codec. This paper makes a firm proposal for the bit patterns of the Picture Start Code (PSC) and the Group of Blocks Start Code (GBSC).

Table 4 in document #122 gave the following VLC set:-

Number	Code	Length
1	1	1
2	001	3
3	010	3
4	011	3
5	00010	5
6	00011	5
7	000010	6
8	000011	6
9	0000010	7
10	0000011	7
11	00000010	8
12	00000011	8
13	000000010	9
14	000000011	9
15	0000000010000001	16
16	0000000010000010	16
17	0000000010000011	16
18	0000000010000100	16
19	0000000010000101	16
20	0000000010000110	16
21	0000000010000111	16
22	0000000010001000	16
.	.	.
.	.	.
.	.	.
.	.	.
.	.	.
.	.	.
138	0000000011111100	16
139	0000000011111101	16
140	0000000011111110	16

This table has a number of significant advantages:

i) The efficiency of the code set for the quantisation data is near optimal

ii) The maximum code length is 16

iii) No words or combination of words contain more than 14 zeros in a row

iv) Re-synchronisation (after a tracking loss due to errors) is highly likely if simple rules are applied such as "if two ones in row are found then assume the next bit is the start of a code word". Other valid rules are also possible.

In document #122 it was suggested that 16 zeros might be used for GBSC. Further thoughts have revealed that this is a rather bad choice, because when retracking after a loss of synchronisation due to errors both the presence **and** exact position of the GBSC is important. Consider the example of code number 22 preceding a GBSC of 16 zeros. The bit pattern would be:-

0000 0000 1000 1000 0000 0000 0000 0000

If we are looking for a GBSC after a loss of synchronisation then 16 zeros may be found in one of four position after the "1" in code number 22. This is unacceptable.

Proposals

i) We propose that the GBSC should be fifteen zeros and a one :-

0000 0000 0000 0001 [5 bit GBSC number]

This will ensure that the phase of the GBSC is available when retracking.

ii) We also propose that a PSC consists of a GBSC followed by 5 bits representing an invalid GOB number. Two possibilities are:-

a) 0000 0000 0000 0001 [0000 0]

b) 0000 0000 0000 0001 [11xx x]

a) has the the advantage that the PSC simply follow the same numbering sequence since GBSCs have numbers in the range 1 to 18 .

b) has the advantage that three bits are spare and these may be be used in the future.

END