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Title: **Quantizer Allocation by TYPE3**

Source: FRG

The flexible hardware specification has two modes of quantizer transmission. In most of the cases it is sufficient to fix the quantizer at the beginning of every GOB. But sometimes it is necessary to adjust the quantizer value more often. Therefore it is possible to transmit the quantizer with every block containing coefficients. It is a disadvantage of the present specification, that in the latter case quantizer values must be transmitted for all blocks containing coefficients.

Proposal:
An expansion of the TYPE3 table by special block types containing new quantizer information allows the modification of the quantizer value whenever desired and saves bits.
To get both, a fast error recovery and an economical use of bits, the following procedure is proposed.

- A starting value for the quantizer is transmitted within every GOB header. It guarantees a defined situation at the beginning of every GOB und provides a good error recovery. That means: QUANT1 of the Flexible Hardware Specification is always present, but without its first bit.

- This value is applied to all following blocks containing transform coefficients until a new quantizer is signalled.

- When no quantizer is signalled within the macro block data, the quantizer value of the GOB header is applied to all macro blocks of the GOB.

- The presence of quantizer data within a macro block is signalled by extended TYPE3 codes and thus changeable on a macro block basis without sacrifying the coding efficiency. An example of extended TYPE3 code is given below.

- When signalled by the special TYPE3 code the new quantizer value follows on TYPE3.

- The new quantizer value is applied to all following transmitted transform coefficients until the next quantizer value is transmitted or the GOB is finished.

- Within a GOB the quantizer value can be adjusted as often as desired.

The structure of the quantizer allocation by TYPE3 is demonstrated by the following example.

For a usual video multiplex the following macro block types exist:
("-Element-" means: repetitive presence for each block of a macro block)

Ident	Type 3	Elements present	Code
1	Intra	-DC-COEFF, TCOEFF-	0100
2	Inter, no MC, Coded	-TCOEFF-	11
3a	Inter, MC, DMV=0, Not Coded	none	0110
3b	Inter, MC, DMV≠0, Not Coded	DMV	100
4a	Inter, MC, DMV=0, Coded	-TCOEFF-	0010
4b	Inter, MC, DMV≠0, Coded	DMV, -TCOEFF-	101

In addition to each block type with coded prediction error an equivalent type with a transmitted quantizer is introduced. They are identified with the suffix Q.

1Q	New Quant, Intra	QUANT, -DC-COEFF, TCOEFF-	0101
2Q	New Quant, Inter, no MC, Coded	QUANT, -TCOEFF-	0111
4aQ	New Quant, Inter, MC, DMV=0, Coded	QUANT, -TCOEFF-	0011
4bQ	New Quant, Inter, MC, DMV≠0, Coded	QUANT, DMV, -TCOEFF-	0001

Thus it is possible to change the quantizer on macro block basis, but it is not necessary to transmit a quantizer with every macro block.