Title: An Identical Sized GOB for Full CIF and Quarter CIF

Source: FRG

With the introduction of a second picture format the intercommunication of codecs with different formats has to be considered. The smaller format is especially intended for low cost picture phones, but realization of a second mode is a burden to all Full CIF codecs. A Full CIF codec must be able to receive and transmit Quarter CIF pictures. Since the formats vary by a factor of 2 in each direction and programmable digital video filters are available today, minor modifications are necessary in the pre- and postprocessing. The modifications in the present video multiplex encoder and decoder are more difficult to realize. But with the use of an identical structured GOB for both picture formats also the implementation of a "bistandard multiplex" becomes manageable.Thereby the multiplex of CIF and QCIF only differs in the number of GOB's. This approach is outlined in the following:

For finding a suitable form of a GOB first the picture formats should be compared. According to the macro block of RM5 (Y0, Y1, Y2, Y3, U, V) a frame consists of:

Format	Pixel Lum.	Macro Blocks
CIF	352 x 288	22 x 18
QCIF	176 x 144	11 x 9

Fig.1: Picture Formats

To get a good balance between 'wasted' bits for GOB headers and a fast error recovery the number of GOBs for CIF should be about 8 to 18. By defining the area of a GOB to a third of a Quarter CIF frame the number 12 is reached.
A Group of Blocks consists of 3 lines of 11 macro blocks each, a total of 33 macro blocks or 198 blocks.

1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22
23	24	25	26	27	28	29	30	31	32	33

Width: 176 pels
Height: 48 lines

Fig.2: GOB with Macro Block Addresses

The block scan in Fig.2 respects a high correlation of the motion vectors of succeeding macro blocks and is an example.

The structure of the smaller format is identical to the upper left part of a CIF picture. Applying this kind of GOB significantly simplifies the realisation of a fall back mode to QCIF without any drawbacks for the realisation of QCIF codecs.

Figure 3 shows the numbering of the GOBs of a Full CIF and a Quarter CIF picture.

CIF

1	2
3	4
5	6
7	8
9	10
11	12

QCIF

1
3
5

Fig.3: Group Numbers for a CIF Picture and a QCIF Picture

Furthermore the mixing of four coded Quarter CIF pictures to one Full CIF without decoding is very simplified. Only the group numbers have to be modified. This can be used for continuos presence multipoint conferencing.

For the 12 GOBs of a Full CIF picture group numbers with four bits are sufficient. The remaining four numbers can be used for other purposes.