Bilinear Chroma Upsampling

The chrominance components have half the vertical and half the horizontal resolution of the luminance. To obtain equal chrominance and luminance resolution, bilinear chroma upsampling is used. Bilinear chroma upsampling computes chroma pixel values by vertical and horizontal interpolation. Vertical interpolation implies adding two rows of chroma values with different weights. The chroma row closest to the luma row gets weight 3/4, while the chroma row farthest from the luma row gets weight 1/4. Figures 0.1, 0.2 and 0.3 illustrate these weights for progressive pictures, while figures 0.4 and 0.5 show the weights for interlaced pictures.

In figures 0.1 to 0.5,

- 00 refers to the first row of luma values of the current macroblock,
- 15 refers to the last row of luma values of the current macroblock,
- c-1 refers to the last row of chroma values of the macroblock one macroblock row up,
- c0 refers to the first row of chroma values of the current macroblock,
- c7 refers to the last row of chroma values of the current macroblock,
- c8 refers to the first row of chroma values of the macroblock one macroblock row down.

The corresponding source file is `resample_bilinear.v`.

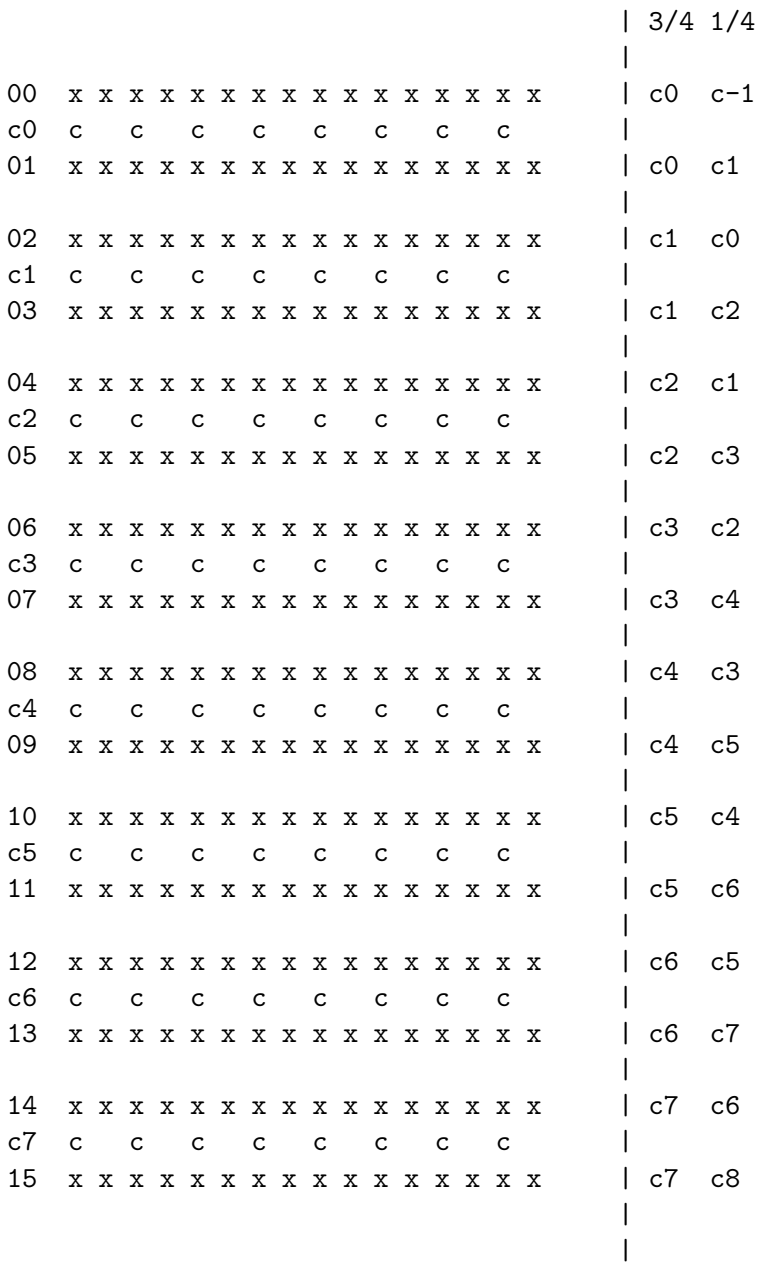

Figure 0.1: Frame picture, progressive upsampling

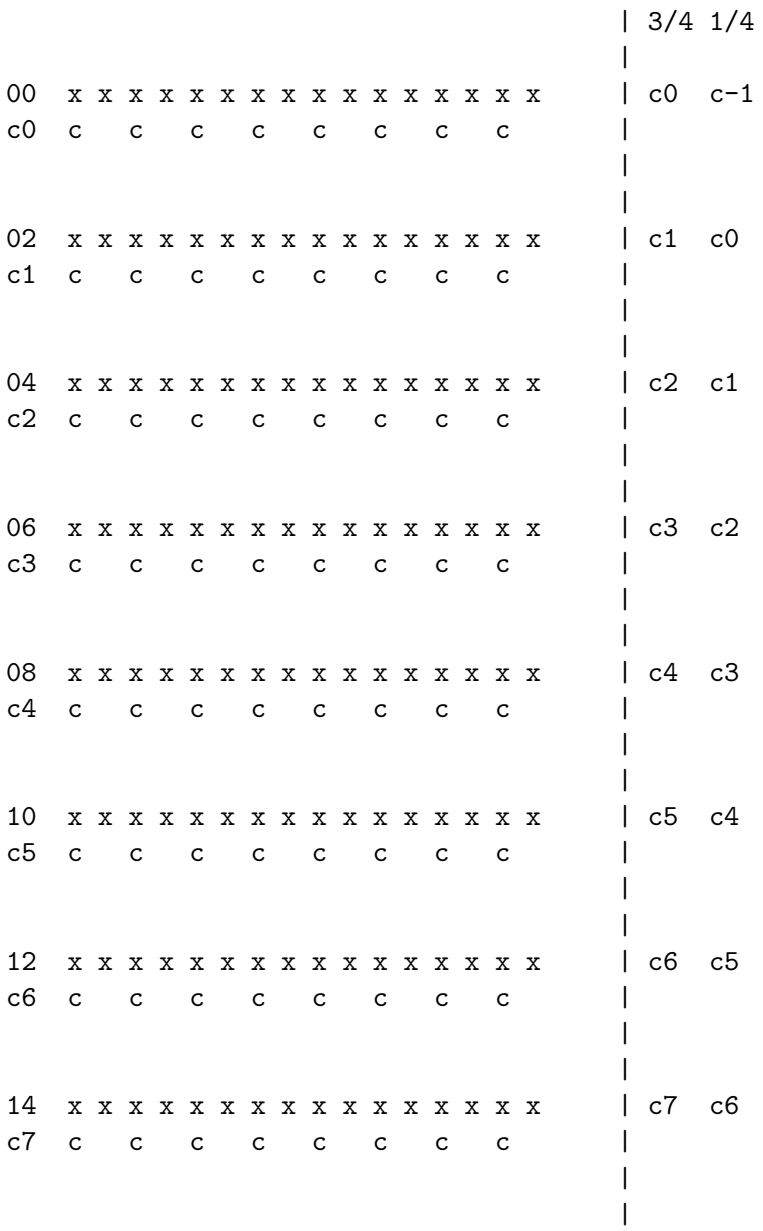

Figure 0.2: Top field, progressive upsampling

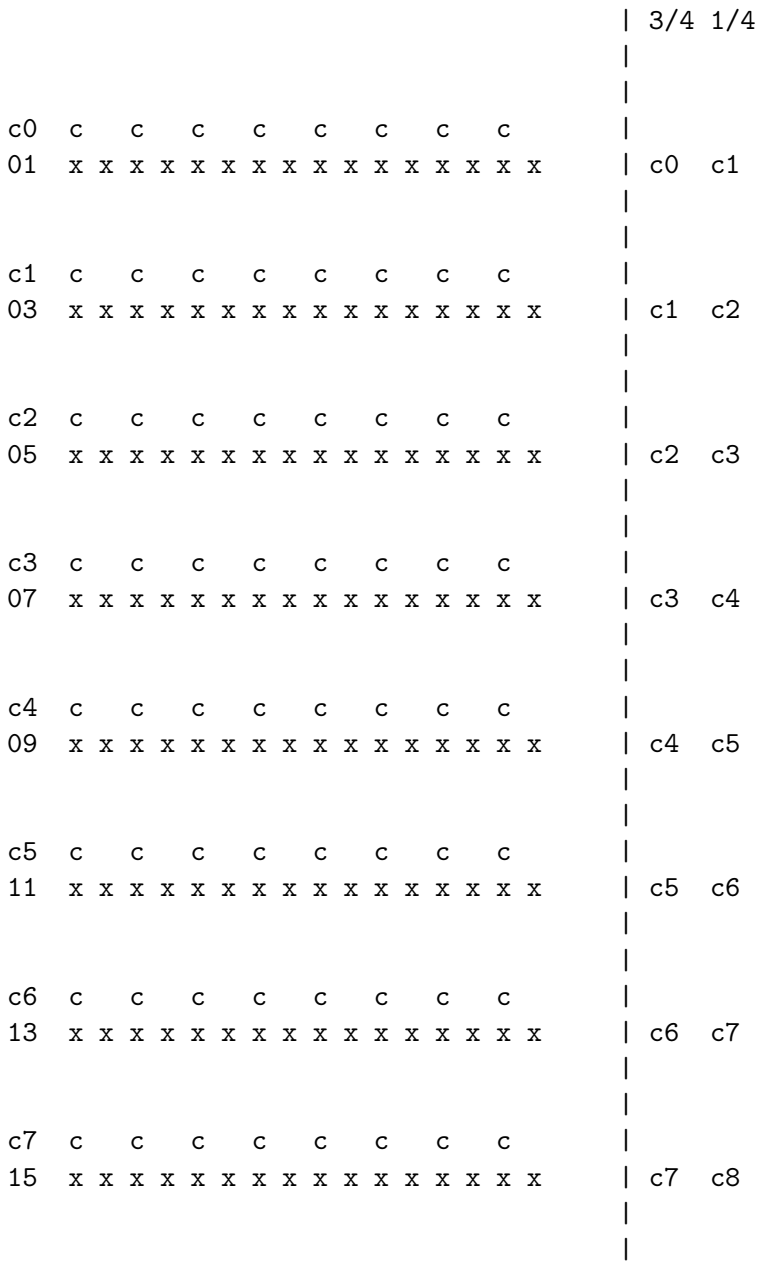

Figure 0.3: Bottom field, progressive upsampling

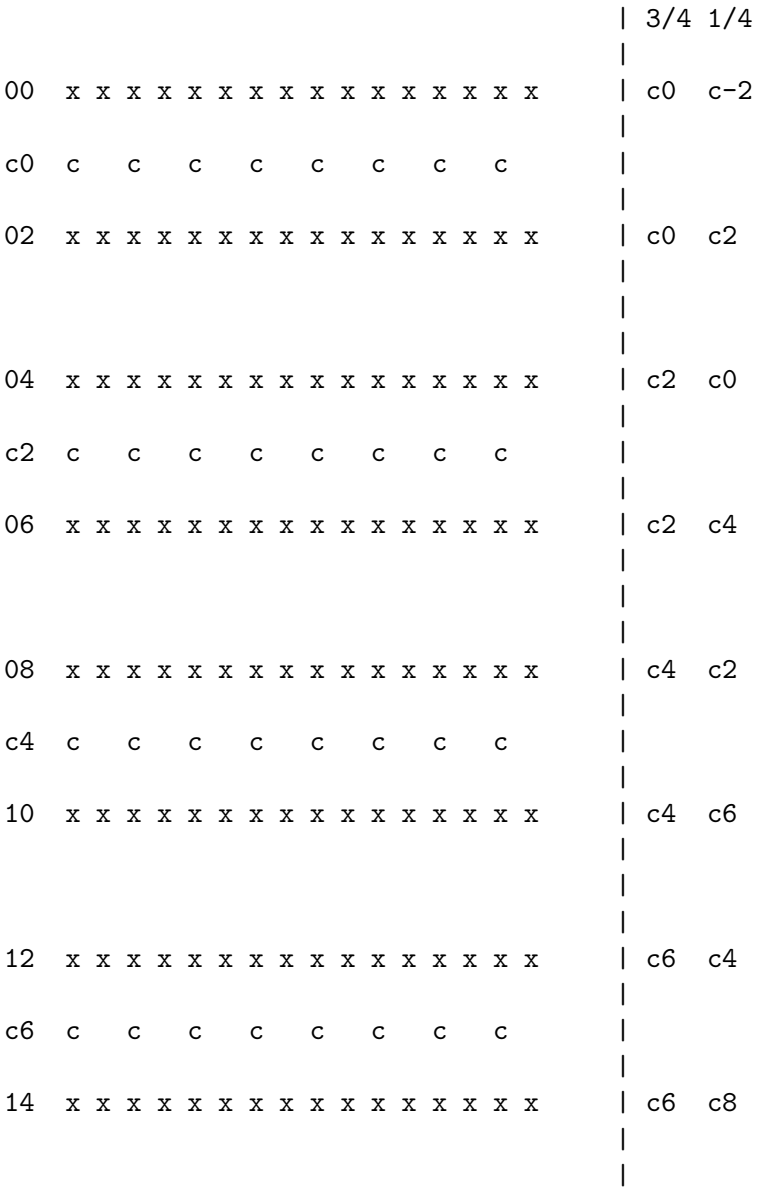

Figure 0.4: Top field, interlaced upsampling

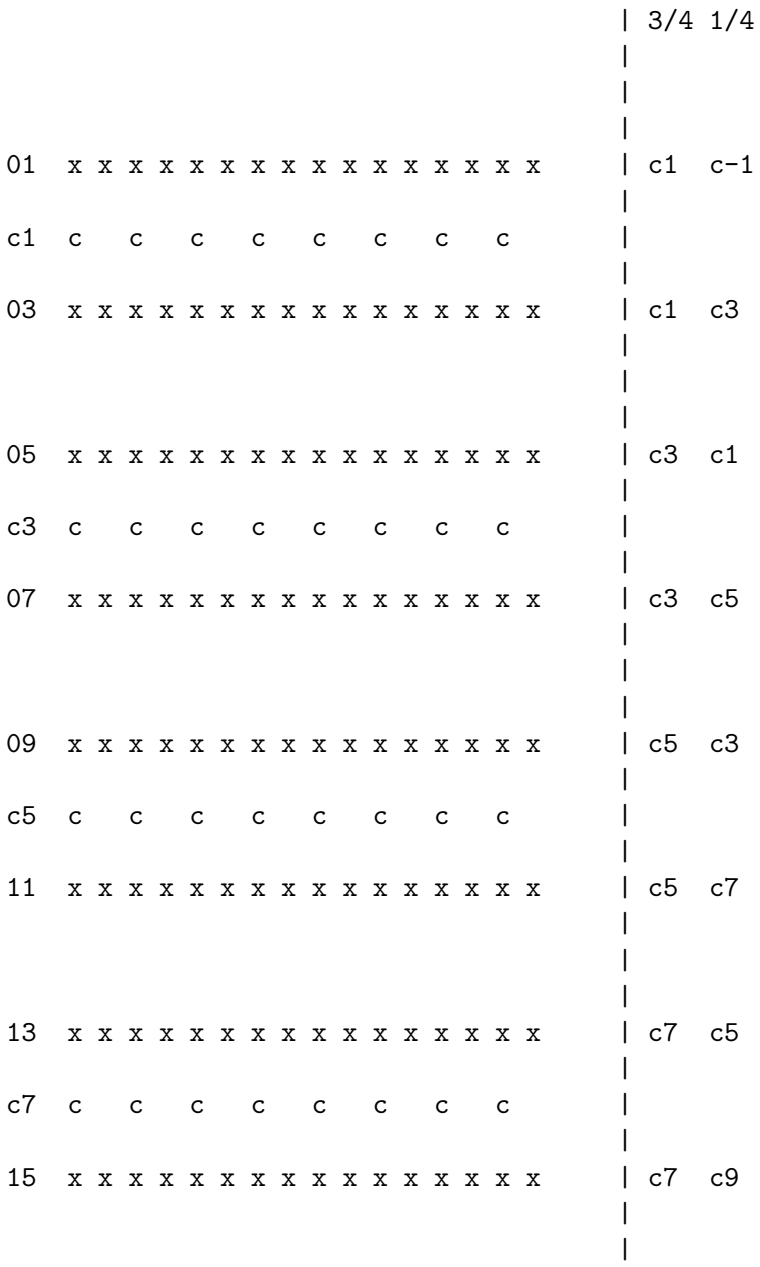

Figure 0.5: Bottom field, interlaced upsampling