

Composite Color System

1. Luminance and Color-difference Components

$$Y = 0.299R + 0.587G + 0.114B$$

$$Cr = R - Y$$

$$Cb = B - Y$$

2. NTSC (59.94hz, 525 lines)

$$Y = 0.299R + 0.587G + 0.114B$$

$$I = 0.596R - 0.274G - 0.322B$$

$$Q = 0.211R - 0.523G + 0.311B$$

$$R = 1.0Y + 0.956I + 0.621Q$$

$$G = 1.0Y - 0.272I - 0.649Q$$

$$B = 1.0Y - 1.106I + 1.703Q$$

3. PAL (50hz, 625 lines)

$$Y = 0.299R + 0.587G + 0.114B$$

$$U = 0.492 (B - Y)$$

$$V = 0.877 (R - Y)$$

4. SECAM (50hz, 625 lines)

$$Y = 0.299R + 0.587G + 0.114B$$

$$Db = -0.450R - 0.833G + 1.333B$$

$$Dr = -1.333R + 1.116G - 0.217B$$

**all RGB are gamma corrected.*

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Summary of parameters used in worldwide color TV standards

Parameter	NTSC	PAL	SECAM
Field rate (Hz)	59.94	50	50
Lines per frame	525	625	625
Gamma	2.2	2.8	2.8
Audio Carrier (MHz)	4.5	QAM	FM
Color Subcarrier (MHz)	3.57	4.43	4.25(U)4.4(V)
Color modulation method	QAM	QAM	FM
Luminance bandwidth(MHz)	4.2	5.0,5.5	6.0
Chrominance bandwidth(MHz)	1.3(I)0.6(Q)	1.3	1.0

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