

# Application Note 57

## Conversion of YC video into Y, C<sub>B</sub>, and C<sub>R</sub> components.

The luminance video, shown in Figure 1, is digitized by the TMC22071A which also produces the 27MHz line locked clock, and the HSYNC and VSYNCV signals. In other systems the TMC22071A can be replaced by a separate ADC, analog clamp, analog AGC, and horizontal phase locked loop circuit. The RC6601 provides the antialiasing filter before the TMC22071A, if a separate ADC and a oversampling filter, such as the TMC2242x, is used the RC6100 could be replaced with a simple low pass filter.

The second ADC is used to digitize the chrominance input, and requires an AGC and clamp circuit. The external line store is only required when the TMC22x5y is implementing a 3 line luma comb, in which case the external line store compensates for the inherent one line of delay in the comb filter.

The TMC22x5y cannot implement a field or frame based comb filter on YC inputs. This can only be achieved if two separate TMC22x53s decoders are used in parallel. In this case one TMC22x53 would comb the luminance signal and the second TMC22x5y would comb the chrominance signal.

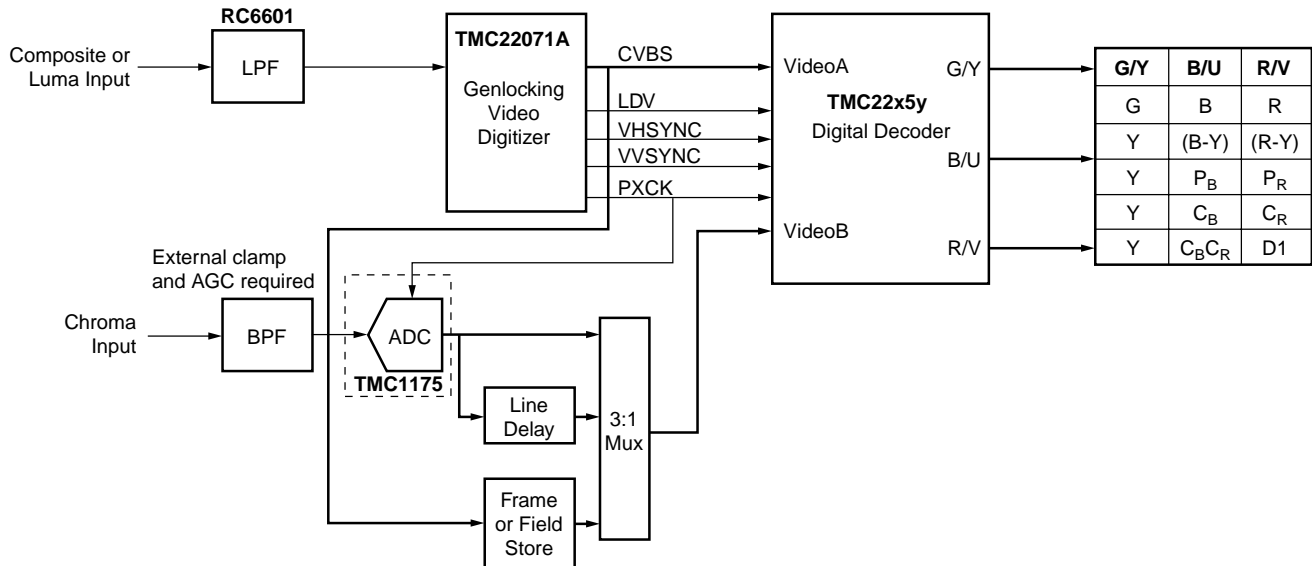


Figure 1: Multipurpose decoder block diagram

In the following application the pixel data rate is assumed to be at 13.5MHz, and the CLOCK is at 27MHz. In addition the pedestal, for NTSC/M compliant signals, is to be removed by the YOFP and not the PED register value (see TMC22x5y APPS\_1 for additional information).

The simplest TMC22x5y configuration, illustrated in Figure 2, is as a luminance proc amp and chrominance demodulator and proc amp, i.e. the TMC22x51. The NTSC register map required for this application is shown in table 1, while the PAL register map is shown in table 2.

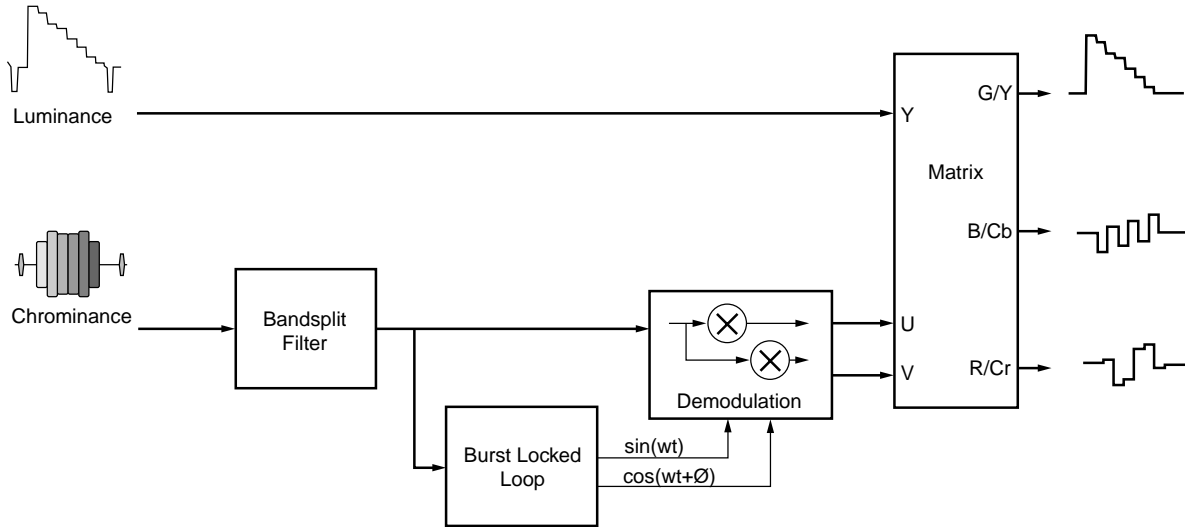


Figure 2: TMC22x51 configuration for YC input to Y, Cb, Cr component output

Although, the luminance signal is connected to VIDEOA the input processor within the TMC22x5y routes the luminance as the secondary input (FLAT) and the chrominance signal as the primary. The primary signal, in the line based configuration, is always passed through the bandsplit filter and produces the SIMPLE low and high frequency outputs to both the comb filter and the YMUX and CMUX multiplexers. The

chrominance channel, in all the examples, is programmed to bypass the bandsplit filter. However, the bandsplit filter could be used to remove low frequency noise if required by setting register 07h bit 3 LOW.

Table 1: NTSC: YC to Y, C<sub>b</sub> and C<sub>r</sub> component video

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0-	C0	07	00	41	20	00	00	08	40	00	24	60	03	00	0B	0A
1-	5A	47	35	D2	23	00	00	00	9C	E3	56	49	04	00	00	00
2-	40	F8	E0	43	00	00	00	00	00	00	00	00	00	00	00	00
3-	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

Table 2: PAL: YC to Y, C<sub>b</sub> and C<sub>r</sub> component video

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0-	D3	07	00	00	20	00	00	0C	40	08	24	60	03	00	0B	0A
1-	60	53	44	D2	23	00	00	00	88	BF	3C	49	40	00	00	00
2-	90	15	13	54	00	00	00	00	00	00	00	00	00	00	00	00
3-	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

**Notes:**

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