RGB Video Switching
(Replacing the HC4053 and Buffer/Amplifier)

Switching Between Video Sources

It is becoming common practice to switch more than one video source. Pericom's *PI5V330 Quad 2-Channel Multiplexer/ Demultiplexer* can replace both the HC4053 analog multiplexer and any buffer/amplifier chip (see Figures 1 and 3).

When using analog switches or multiplexers, with relatively high ON-resistance, it is often common to see a relatively high-insertion loss or voltage drop across the switch. For video applications, this on-resistance (R_{ON}) must be compensated by using a gain-stage buffer/amplifier. Since the PI5V330 has approximately 3Ω R_{ON}, industry standard current output RAMDACs can easily drive the switch and cable with minimal loss without the need for the buffer/amplifier.

Replacing HC4053

The HC4053 has typically 40Ω R_{ON}, while the PI5V330 has 3Ω. This reduction in R_{ON} results in a distortion decrease down to –28dB or four percent when the line termination is 75Ω. Distortion = 20LOG (R_{ON}/R_L).

Replacing the Buffer/Amplifier

As mentioned previously, if the RAMDAC output compliance is not exceeded, it can supply enough current to drive the cable so the buffer/amplifier is no longer needed.

To ensure one LSB nonlinearity, this compliance is generally +1.4V. Figure 3 shows the voltage at the video input to be 1.08V, well within maximum compliance. Normally, the RAMDAC can drive 26.66mA into a doubly terminated resistor (75Ω/75Ω = 37.5Ω). This conforms to the RS-343 specification. The PI5V330 has a drive-through current of 100mA.

1. Performs a current-to-voltage conversion.
2. Matches the 75Ω cable impedance to reduce reflections. This video coax cable is generally only six-feet long.

PI5V330 Advantages in Video Application

- Ultra-low R_{ON}
- Crosstalk = 60dB @ 10 MHz
- Single supply operation: +5V
- Wide bandwidth = 190 MHz

Note that the PI5V330 can be used in SGA or SVGA (800x600), XGA (1024x768), or Hi Res (1500x1200 and beyond) resolutions where pixels need to be energized quickly.

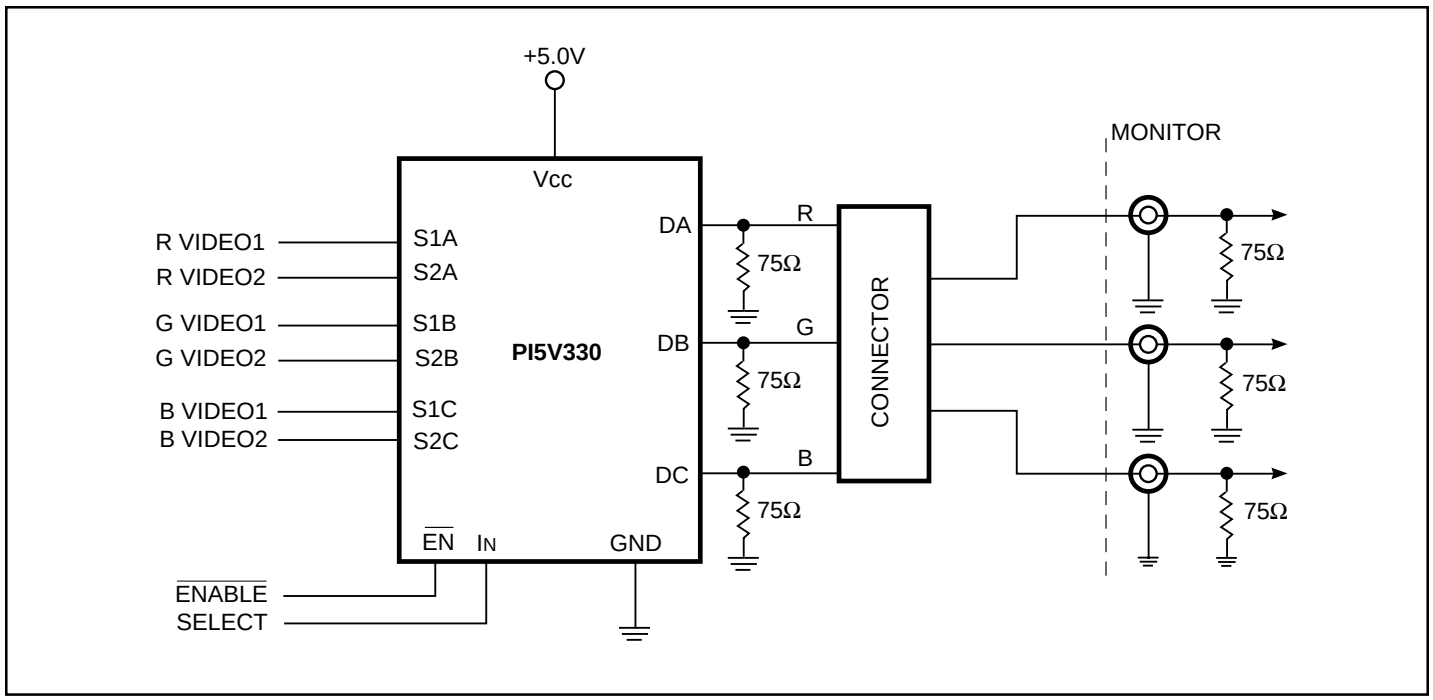

Figure 1. RGB Video Circuit (new design)

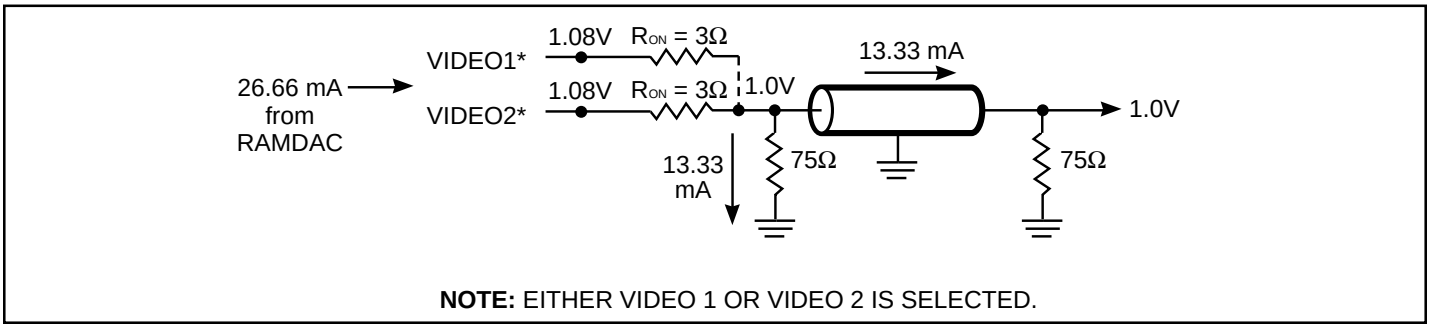

Figure 2. PI5V330 Drive-thru Current and Distortion Equivalent Circuit

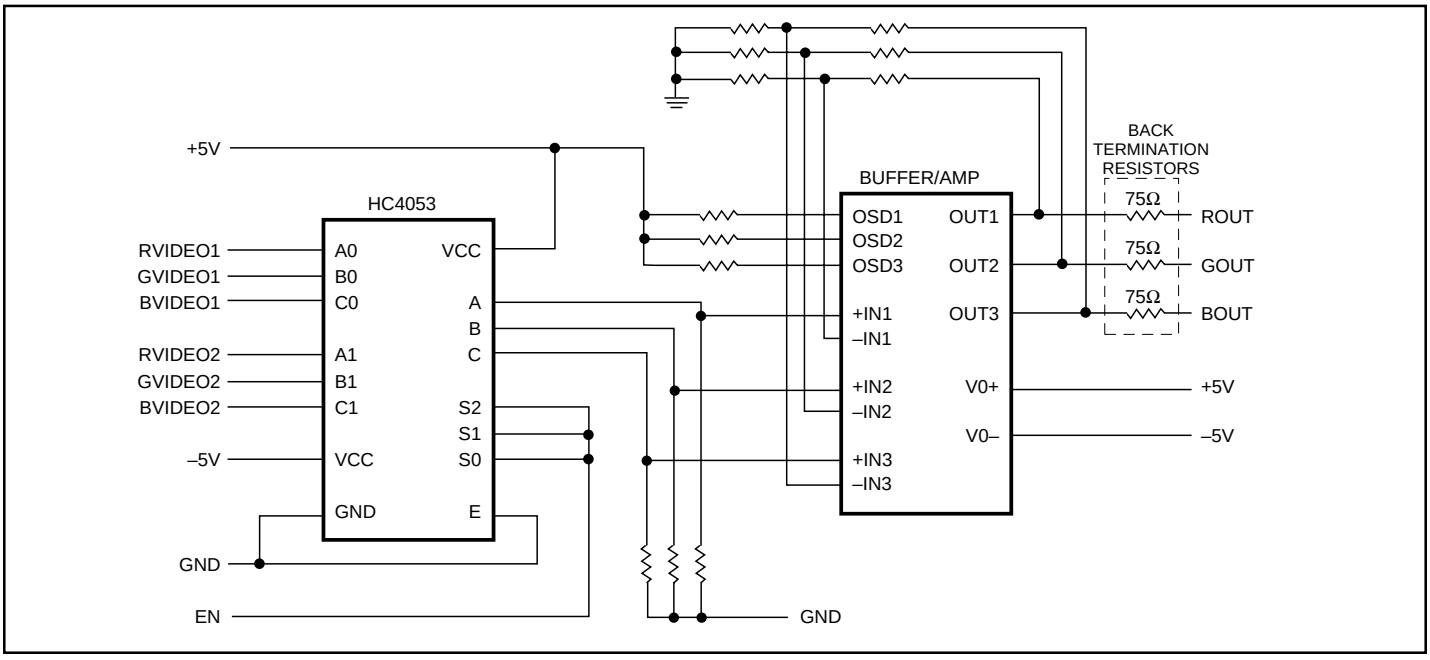

Figure 3. PI5V330 Replacement Circuit (old design)

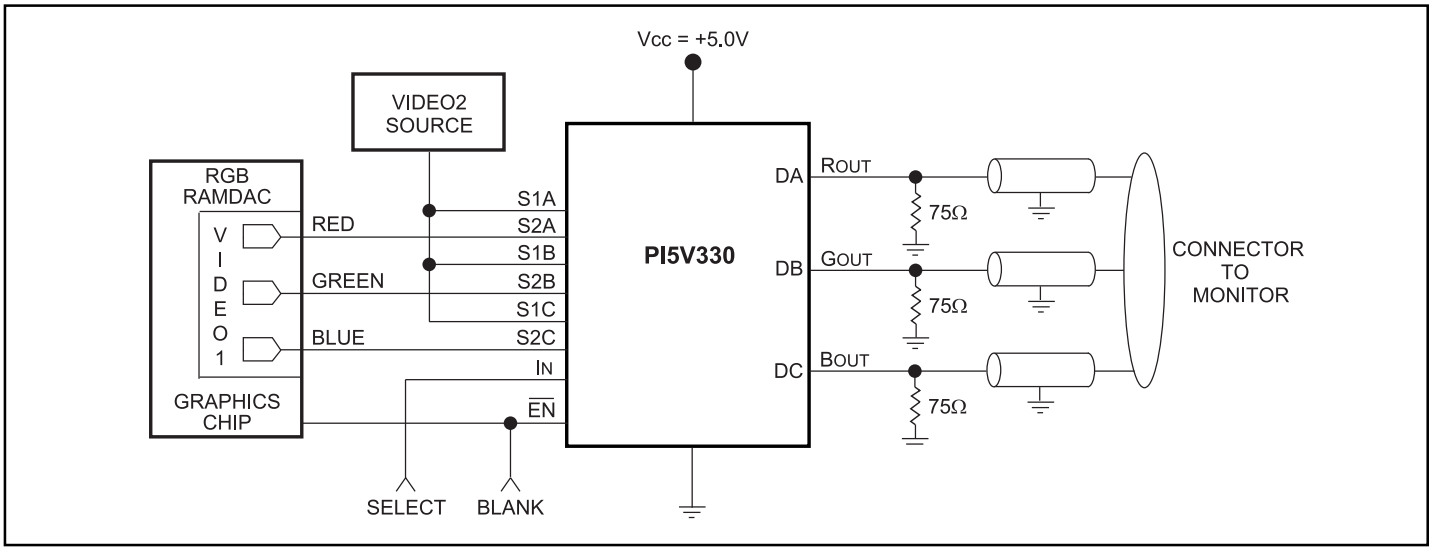

Figure 4. New System Circuit