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One Transistor Gives Clean HDTV And NTSC Video Sync Separation

Tamara Papalias | Jan 19, 2006

(HDTV) is creating a small revolution in the video industry. New video systems must be capable of handling the standard National Television System Committee (NTSC) composite signal as well as high-definition signals. Also, low-cost and low-power concerns drive system designers to find the simplest solutions. Here's a one-transistor network that lets a single video sync separator operate for both HDTV and NTSC systems.

In the sample NTSC signal shown in Figure 1a, the color burst and color subcarriers are identified. A "slice level" is drawn halfway down the drop for horizontal synchronization. Variations in color burst or dark blues within the subcarrier can dip below the slice level, causing false sync pulses in addition to the 15-kHz horizontal sync signal. With high-definition (HD) signals, the color information is carried separately *(Fig. 1b)*. So, there's no color burst or subcarrier to cause false sync pulses. However, note that the horizontal sync pulse is shorter and higher in frequency (20 kHz).

It's advantageous if a single sync separator will operate with both HD and NTSC signals. Because false triggers can occur with NTSC signals, adding a filter in the sync-separator path can reduce the height of the color burst and subcarrier signals. This filter cannot be included during HD detection, though, because the shorter sync pulse also would be attenuated, causing missed triggers.

The ISL59885 is a sync separator that features both HD and NTSC detection. An output, labeled HD, responds to the type of input—high for NTSC and low for HD. This external pin can be used to insert a low-pass filter into the sync separator path, preventing false sync pulses in composite video. The circuit is shown in Figure 2.

When a composite signal (NTSC/PAL) is detected, the filter is enabled by applying a logic high to the base of the transistor. When component signal (HD) is detected, the filter is disabled by having the HD pin at a logic low state. Although the transistor is disabled during HD, a low-pass

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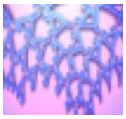
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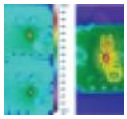
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The Front End: Taking the Mystery Out of "Minimum Stable Gain"

Compensated...Decompensated...Optimized for higher-gain apps...What does it all mean? The Filter Wizard reaches back in time to bring some clarity to "op-amp compensation."

Kendall Castor-Perry | May 21, 2019

just published nearly 20 years ago, when I was at the Burr-Brown Corporation. Op-amp compensation is still a topic that surfaces regularly, so I thought revisiting it would surely be timely. I couldn't locate it on the web—it was originally printed in a paper magazine. But an old backup hard drive yielded a hackable copy. So, sans the commercial puffery (I was trying to sell Burr-Brown op amps, after all) and with judicious editing, here is a classic 20th Century example of Castor-Perry technical outreach!

Ahh, 1999, Happy Days...

Nowadays it's all websites and PDF files, but when I was a young engineer the Databook was a source of knowledge and inspiration in analog circuit design. I felt that these were books designed to make you feel good about circuit design and the wonderful world of components, especially that sine qua non of the analog designer's art, the op amp.

Then one day I chanced upon the datasheet of an amplifier that, as one of the bullet points proudly displayed on the front page, boasted a Minimum Stable Gain of 5. The beginnings of a strange chill passed over me: Was this good? They must think it important to give it such prominence, and yet, it did sound rather like a warning, like "Maximum Occupancy: 35 Seated, 25 Standing" on a bus.

My colleagues weren't able to help me out in my time of confusion. What if I were to use it in a circuit with a gain of x4.9? x4.8? Would it work?

Would it fail 2% of the time? Which 2%? Help!!

The manufacturers must have realized that these were not very easy products to sell. They tried changing the language used on the datasheets; the term "decompensated" cropped up more often but probably frightened even more people off. Most recently, the more need-focused "optimized for higher-gain applications" has appeared.

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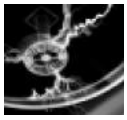

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