ADCS9888

Analog Signals are Still Driving Digital Displays

Literature Number: SNAA112

Technology Edge

Analog Signals are Still Driving Digital Displays

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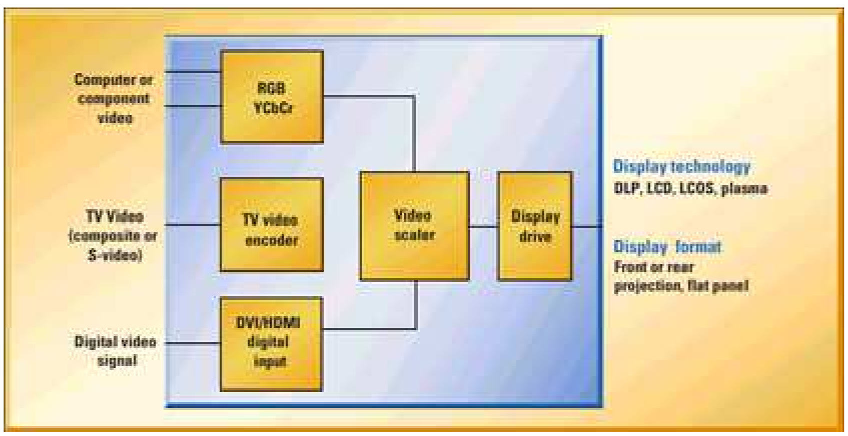
Modern digital video display devices are ever present. Digital video projectors are reaching new heights of performance versus price. Dropping prices, and the obvious space advantages of flat-panel displays are driving a rapid shift away from traditional CRT monitors for corporate and consumer users. Advanced home entertainment displays of various technologies and formats are the hot consumer item for many buyers.

All of these products face a common problem. Though all of the displays generate the video image using digital techniques, many of the video sources remain firmly entrenched in the analog world. And there is a vast array of analog sources to contend with:

- Computer video sources with component video and separate digital synchronizing signals.
- Component video sources from DVD players and set-top boxes with numerous standard and high-definition flavors and embedded synchronizing signals.
- TV composite video sources including the venerable NTSC and PAL signals and newer S-video.

In addition, digital-input signals are also becoming more common. All of these potential inputs create a challenge for the display designer. The analog signals need to be converted into a digital form so they can be scaled and optimized for the performance of the targeted display device. A simple block diagram of a typical system is shown below in Figure 1.



There are many ways to design a system to include all of these required elements. Ideally, a single, integrated IC would be able to receive all of the different input video signals, perform the required scaling functions, and transmit the resulting data to the display subsystem. The challenging and often conflicting requirements of such a device have so far prevented the development of a cost effective single-chip solution to this problem. Most systems resort to a less integrated approach, optimizing the technology, performance, and cost of the different blocks.

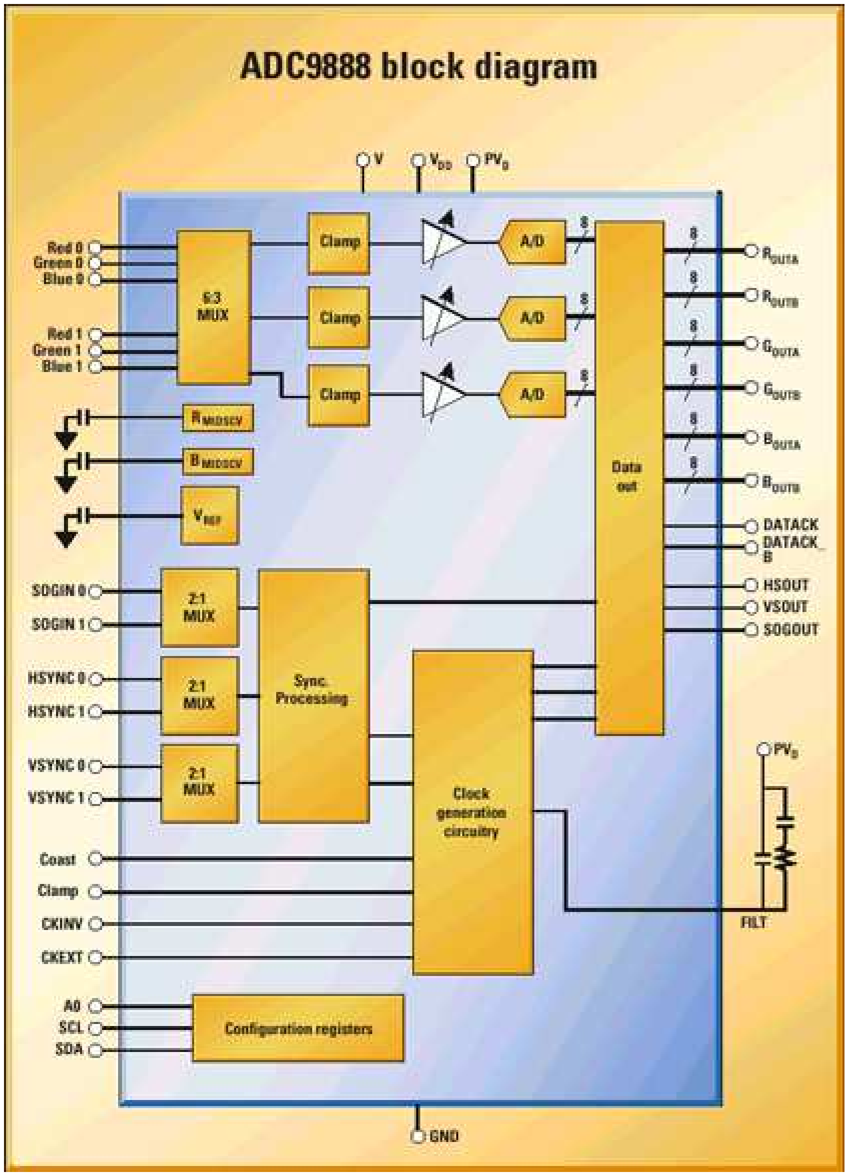
National's ADCS9888 provides a key part of this total system, at a very low cost. It captures RGB computer video at resolutions from VGA to UXGA or YCbCr component video at resolutions from 480i to 1080i, including 720p. Common computer-video resolutions are continually increasing. The ADCS9888 can operate at conversion rates of up to 205 million samples per second, supporting resolutions as high as 1600 by 1200 at 75 frames per second. A simplified block diagram of the ADCS9888 is shown in Figure 2 at the right.

One of the key features of the device is the built-in 2 to 1 mux that allows two separate input-signal connections. Each input can support either computer (RGB) or component (YCbCr) video. The inputs have selectable zero-scale or mid-scale DC clamping for this purpose. Adjustable gain and offset allow the device to compensate for input signals that are larger or smaller than the nominal peak-to-peak levels. Three 8-bit, 205 megasample/s (max.) ADCs are built in to support the highest common computer-video resolutions.

A sophisticated synchronization-processing block, including a PLL and on-chip VCO, is used to create a pixel-rate sampling clock to drive the ADCs and output circuitry. Discrete or composite digital-synchronizing-signals or analog-composite-synchronizing sources are supported. The output data formatter provides system flexibility, supporting the widest possible range of scalers and DSPs.

A simple serial interface is used to access the configuration and status registers. Controls include the ability to override the automatic power saving mode in the IC.

For more information on National's data conversion products, visit:
www.national.com/adc



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