

12-Bit Digital Signal Driver and 12-Bit LCD Driver Form
the Industry's First 12-Bit Data Projector LCD System

CXD3531R

CXA7004R

Advances in both LCD panel technology and optical technology have brought remarkable progress to the performance of LCD data projectors.

In particular, brightness and contrast have improved considerably, and these projectors are now capable of reproducing subtle color differences that were previously impossible to display.

Sony has now developed two ICs that can deliver the full performance of LCD panels based on these revolutionary technologies. These are the CXD3531R 12-bit digital signal driver and the CXA7004R LCD driver with built-in 12-bit D/A converters.

- 12-bit digital signal driver
 - 12-bit precision arithmetic processing
 - Achieves high uniformity
- LCD driver with built-in 12-bit D/A converters
 - Interchannel error: 2 mV
 - Includes a 3-wire serial interface
- Supports all display formats
- For use in 12-bit LCD systems

■ 12-Bit Digital Signal Driver

The CXD3531R is a 12-bit digital signal driver with integral video signal adjustment functions and an on-chip timing generator that supports all Sony LCD panels. (See figure 1.) By performing its arithmetic processing with 12-bit precision, the CXD3531R is able to display smooth gradations that are impossible to display with the conventional 10-bit precision. (See table 1.) Like conventional products, the CXD3531R provides a diverse set of functions required in LCD projectors, such as black frame processing and support for on-screen display. Furthermore, the CXD3531R adds new functions, such as ghost cancellation and vertical line cancellation, to achieve high uniformity in image display.

■ LCD Driver with Built-in 12-Bit D/A Converters

The CXA7004R is high-precision LCD driver that takes a 12-bit digital video signal input and produces 6 demultiplexed outputs. (See figure 2.) Interchannel error is the basic parameter used to express driver performance. The CXA7004R's interchannel error has been reduced, by a design optimized for 12-bit precision, from the previous 10 mV to 2 mV. Thus this device achieves the highest level of precision. (See table 2.) The functions and analog parameters required for the LCD panel can be set up over a 3-wire serial interface. This obviates the need for the external components that were previously required for setting the analog parameters, and can significantly reduce the time and costs required for analog adjustment.

■ Support for All Display Formats

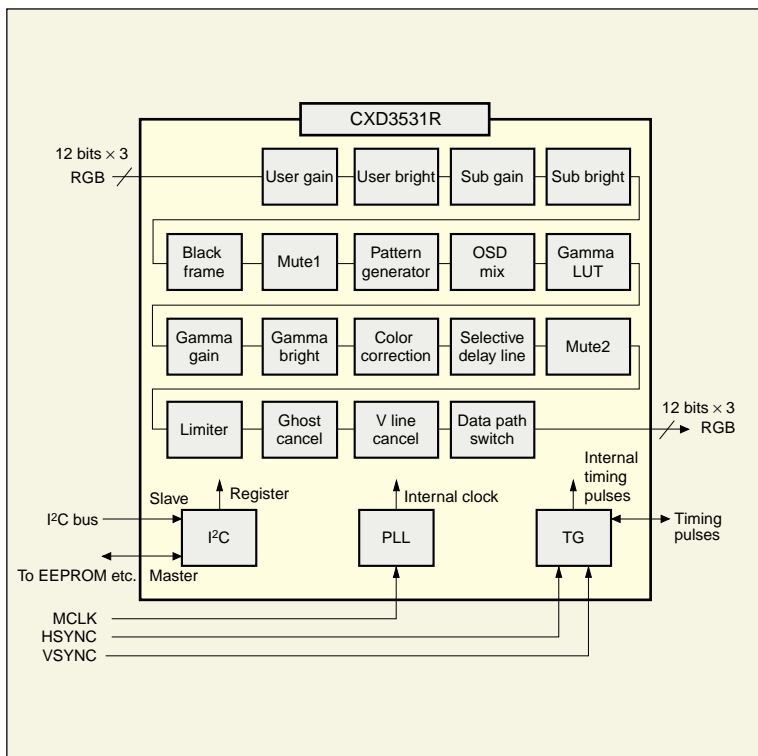
A 12-bit LCD system formed from the CXA7004R and CXD3531R can support all formats from SVGA to UXGA and provides both fine-grained image adjustments and high picture quality video signal display. Figure 3 shows the structure of an XGA LCD data projector drive system.

■ Lineup Matching End Product Needs

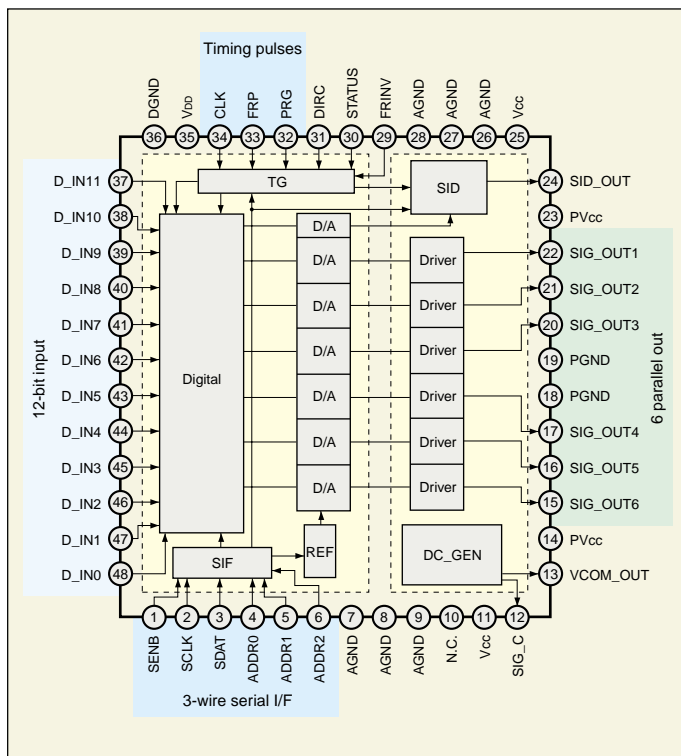
Sony plans on expanding its lineup to include 10-bit digital signal drivers and 10-bit LCD drivers with the same package and same functions for each IC to create a lineup that supports a wide range of end product needs. Keep your eye on Sony LCD systems for the latest technology.

V O I C E

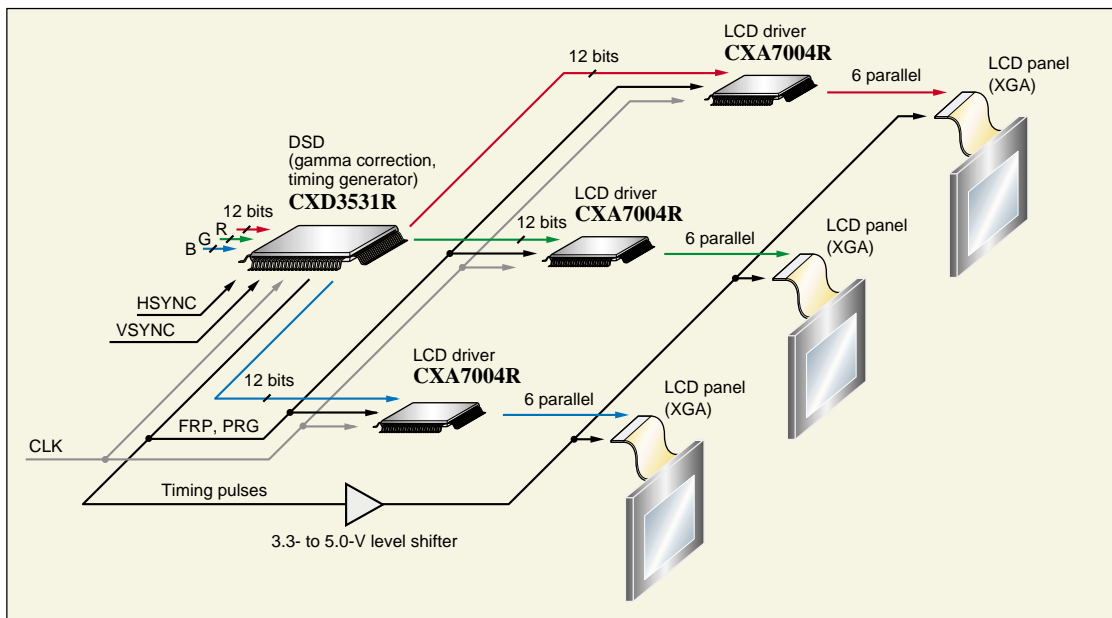
The CXD3531R, with its 12-bit resolution, creates smooth tonal transitions. The CXA7004R achieves the highest precision and adjustment-free operation. I am confident that the picture quality performance and the superlative functionality created by the combination of these 12-bit LCD ICs will prove more than satisfactory in your application systems.



■ Figure 1 CXD3531R Block Diagram



■ Figure 2 CXA7004R Block Diagram



■ Figure 3 XGA System Structure

■ Table 1 CXD3526GG and CXD3531R Comparison

Item	CXD3526GG	CXD3531R
I/O	10 bits/10 bits	12 bits/12 bits
Number of color shading correction points	1792/CH	4096/CH
Gamma table	1024 words	4096 words
Package	144-pin BGA	176-pin LQFP

■ Table 2 CXA7000R and CXA7004R Comparison

Item	CXA7000R	CXA7004R
Resolution	10 bits	12 bits
Number of output channels	6	6
Interchannel error	10 mV	2 mV
Package	64-pin LQFP	48-pin LQFP