Adaptive Equalization Cable Equalizer IC Increases End Product Design Flexibility and Features a Two-Input HDMI/DVI Switch

CXB1441R

The CXB1441R is a revolutionary cable equalizer IC that extends, to a maximum of 50 meters*1, the cable length for the HDMI and DVI specifications for digital audio, video, and PC standard interfaces and that at the same time makes the development of the receiver block of such equipment significantly easier.
High-density data transmission over cable lengths that previously could not be used is made possible by using the CXB1441R, which supports a maximum data rate of 1.65 Gbps between the HDMI/DVI receiver IC and the cable.
Furthermore, the provision of two input ports, the small size, and the low power of the CXB1441R support both miniaturization and reduced costs in end products.

*1: Sony reference data for 480p transmission under the standard Sony test environment

- **Compensates for cable attenuation and improves the signal eye pattern**
- **Selects and outputs one of two TMDS signal systems (three differential data pairs and one differential clock pair)**
- **Single 3.3 V power supply, power consumption of about 0.5 W. Lead-free 48-pin LQFP package (7 mm × 7 mm)**

HDMI/DVI

HDMI is the standard digital interface for large-screen digital TVs, whose image quality is rapidly improving. It is hoped that this interface, which can be called the home electronics version of DVI, will soon be adopted in all digital TVs. Since these interfaces directly exchange encoded uncompressed digital data between equipment, the amount of data is extremely large and requires a data rate of about 4.5 Gbps for full high-definition video. To directly connect DVD players, set top boxes, games, or other video sources to a display device for this data requires cable with superlative high-frequency characteristics. Such cable is, however, extremely expensive and hard to find.

Cable Equalizer

Currently, in conventional HDMI/DVI receiver ICs, reception for 1080p video (data rate: 1.48 Gbps) is not possible over a standard quality 10 meter cable. The reason for this is that the receiver IC performance is not adequate to handle the increased jitter and signal attenuation that arises due to the transmission loss in the cable. What can resolve this problem is the CXB1441R cable equalizer IC. The powerful equalizer functions overcome the cable attenuation and cable jitter and improve the signal amplitude and eye pattern. This equalizer circuit was implemented by adopting Sony's unique high-speed wire communication IC circuit technologies that have a proven track record in GVIF*2 applications and high-speed mixed-signal BiCMOS process.

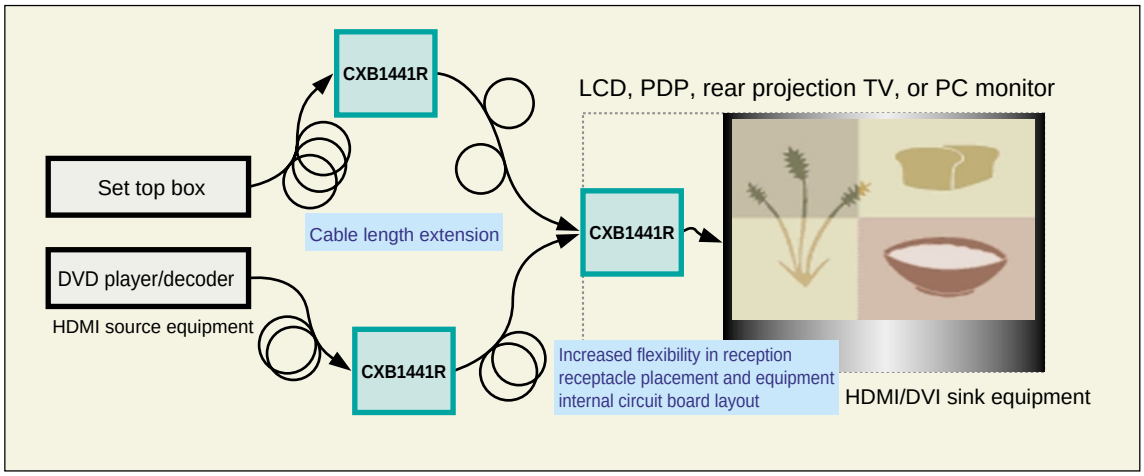
*2: GVIF: Gigabit Video InterFace

Significant Increase in Application Design Flexibility

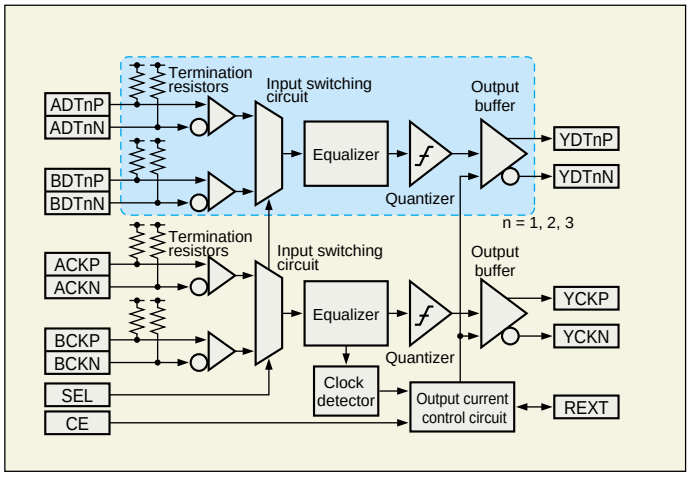
This IC's powerful equalizing functions do not require any external control signals (only two external signals required for control: a chip enable signal and an input port selection signal). Furthermore, this IC's compact size (7 mm × 7 mm LQFP package) and low power (about 0.5 W) contribute to even more compact design of the internal HDMI/DVI receiver block. Also, comparatively inexpensive FFC and FPC flat cable can be used for output signal routing.
Receiver modules formed from external parts including this IC and a receptacle can radically increase the circuit board positioning flexibility in end products, can make design easier, and can contribute to miniaturization and reduced costs.

V O I C E

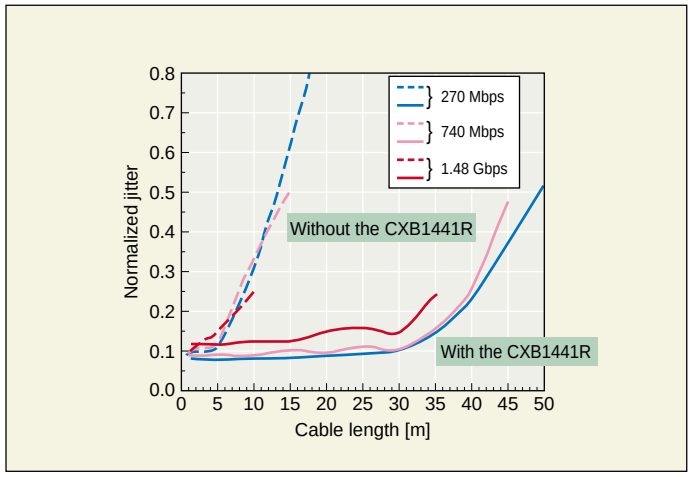
The cable equalizer, which is the CXB1441R's backbone technology, actually has a history of over 10 years in commercial video signal SDI applications and is a Sony specialty. This latest equalizer, in which this traditional technology has been refined, supports our customers in their design of creative TV set products.
In the future, Sony will continue to release, one after another, ICs that make it easy to develop end products that were previously difficult due to high-frequency design issues.



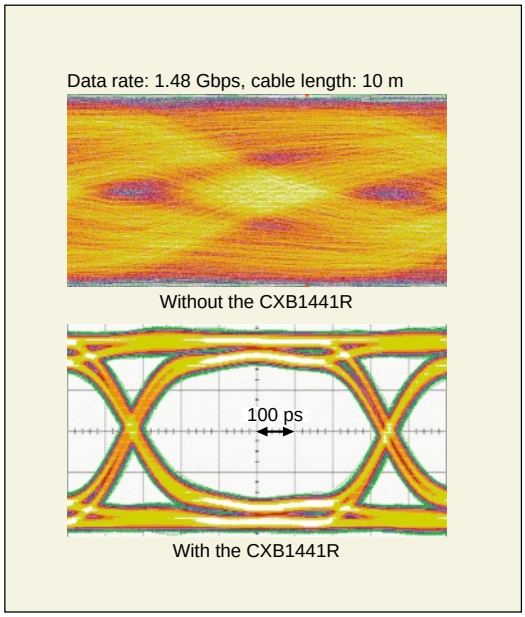
■ **Figure 1 CXB1441R Applications**



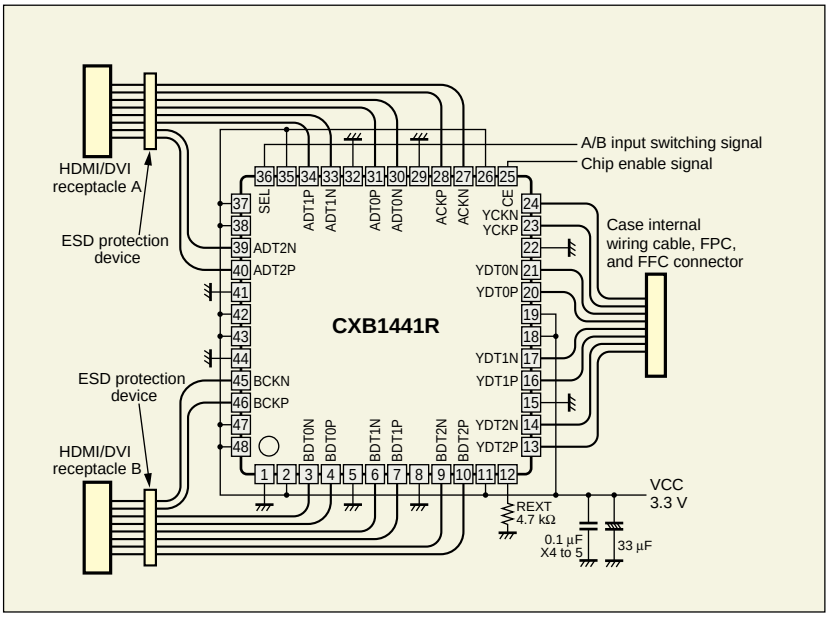
■ **Figure 2 Block Diagram**



■ **Figure 3 Jitter Rejection Characteristics**



■ **Figure 4 Improved Eye Pattern Waveform**



■ **Figure 5 Application Circuit Example**