

# CXD2823ER

## Video Demodulation and Multiplexed Audio Demodulation IC Supports Worldwide Terrestrial Analog Broadcast Standards



The CXD2823ER (shown at the left) is the successor of the CXD2813R (shown at the right).

The newly-developed Sony CXD2823ER can, in conjunction with the CXD3787ER terrestrial silicon tuner IC, implement ultraminiature, thin-form tuners.

In addition to video demodulation functions for worldwide analog broadcasts, the M/N, B/G, I, D/K, and L/L' systems, the CXD2823ER also includes multiplexed audio demodulation functions for the EIAJ, BTSC, A2, and NICAM standards.

The CXD2823ER contributes to higher picture quality and shorter development times by including an equalizer function that can adjust the CVBS video output signal video frequency characteristics and group delay characteristics as a digital circuit.

- Sony silicon tuner IC control functions
- Video output characteristic correction equalizer function
- Multiplexed audio demodulation function that supports worldwide standards
- High linearity 12-bit A/D converter
- Horizontal sync signal detection function

### Support for Worldwide Analog Broadcast Reception

Although termination of analog broadcasting is scheduled for 2009 in the US and 2011 in Japan, functions for analog broadcast reception are still in demand throughout the world.

Sony has therefore developed a high picture quality analog broadcast reception IC to match this high-definition age.

This IC integrates both video demodulation and multiplexed audio demodulation functions on a single chip and supports worldwide multiplexed audio broadcasts in the EIAJ, BTSC, A2, and NICAM standards.

Since the CXD2823ER provides worldwide support, it radically improves product design efficiency for tuner modules and TV sets.

### Optimal Chip Set in Combination with Sony Silicon Tuner ICs

Since the CXD2823ER includes software that is optimized for obtaining the best

performance from Sony silicon tuner ICs, only simple commands from the TV set's microcontroller are required. This means that end products can be implemented with the same ease as a conventional CAN tuner.

### High-Performance Video Demodulation Functions

The CXD2823ER includes a video output signal adjustment equalizer, and can optimize the video frequency characteristics and group delay characteristics for each broadcast system.

Unlike applications built using conventional analog processing circuits, there is no need for a trial and error sequence of creating and testing SAW filters to create the desired picture quality. With the CXD2823ER, applications can create the picture quality by simply rewriting register settings over the I<sup>2</sup>C bus.

In TV sets implemented with conventional analog signal-processing techniques, it was always an issue whether or not characteristics variations due to sample-to-sample variations and changes in supply voltage and temperature could be held down to levels low enough to allow mass production. With the CXD2823ER, however, it is no longer necessary to even think about these issues due to the adoption of digital signal processing.

### Contributing to Lower Costs

A SAW filter is not required when the CXD2823ER is used in a chip set with a Sony silicon tuner IC. When supporting SECAM-L and SECAM-L', the 2 to 4 SAW filters and

their switching circuits can be eliminated. Furthermore, the CXD2823ER provides a horizontal sync signal detection function and, when implementing a channel search function in the TV set, the horizontal sync signal detection circuit in the TV set itself can be eliminated.

Since the CXD2823ER allows a large reduction in the number of peripheral components compared to a conventional analog signal-processing IC implementation, it can achieve significant cost reductions in the analog broadcast demodulation block for worldwide broadcast reception.

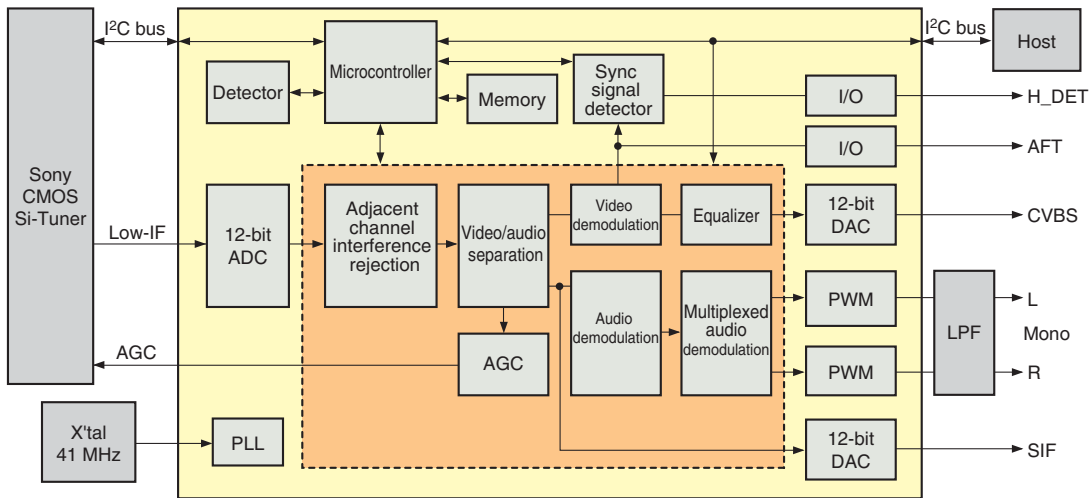
### Low Power Consumption

The CXD2823ER's power consumption is about 200 mW, even when decoding multiplexed audio broadcasts. This is about 1/3 of that of conventional circuits. This can be effective in reducing power consumption in TV sets.

## V O I C E

While the newly-developed CXD2823ER is a digital signal-processing IC, it actually includes many Sony analog signal-processing technologies. I strongly recommend that you look into Sony's lineup of silicon tuner ICs, which hold great possibilities for further miniaturization, including providing multiple tuners in a single TV set, and lower costs in the future.

**Figure 1** Block Diagram



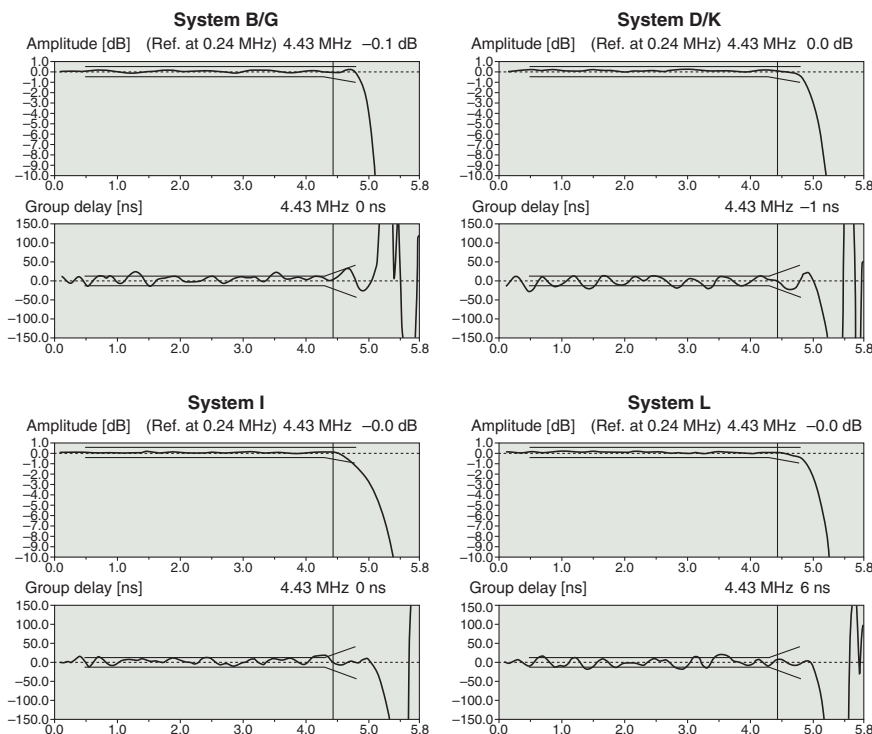
**Photograph 1** Module Photograph



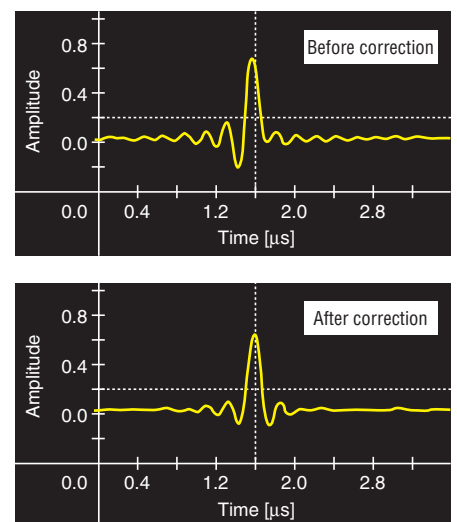
**Table 1** Basic Performance

Item		Characteristics when used with a Sony silicon tuner IC	Typical characteristics of conventional CAN tuners
Video	Maximum sensitivity	-95 dBm	-95 dBm
	Maximum video S/N	49 dB@-35 dBm	47 dB@-35 dBm
	Noise limiter sensitivity	-64 dBm	-64 dBm
	Variations in frequency characteristics/group delay	Within $\pm 0.5$ dB/ within $\pm 20$ ns	Within $\pm 3$ dB/ within $\pm 50$ ns
	DG/DP	0.7%/0.7°	1.5%/1.6°
Sound	Stereo S/N	55 dB	49 dB
	Stereo distortion	0.08%	0.1%
	Stereo separation	46.0 dB	33.0 dB
	S/Buzz	54.0 dB	53.5 dB

**Figure 1** Frequency Characteristics and Group Delay Correction by Worldwide TV Standard



**Ringing Characteristics Correction**



Note: Since the amplitude waveform indicates the equalizer performance, these are matched to waveforms that are flatter than those that appear in actual practice.