In the evolution of high-quality video, 4K video is seen as the next step up from full HD in LCD TV and home theater projectors. Sony is now releasing the CXD4736GB, an IC that generates realistic 4K (4,096 × 2,160 pixels) video signals from full HD (1,920 × 1,080 pixels) resolution video.

This IC up-converts conventional full HD super-resolution processing to 4K video signals and further evolves the pattern-classification procedure of “the database-type super-resolution” technology to include a “learning function”, which dramatically enhances classification performance resulting in high resolution and realistic 4K video.

Since all the functions required for processing 4K video signals are integrated into a single chip, a 4K video system can easily be configured simply by adding the CXD4736GB to a full HD system.

Sony's unique "database-type super-resolution" technology for 4K video

Automatic control of quality measurement and super-resolution processing of video

Super-resolution technology tailored to the video display device

All the required functions for 4K video signal processing in a single chip

"Database-type super-resolution" refers to real-time video analysis and pattern classification by referencing a database to enable perfect super-resolution processing of any video to reproduce the finest detail of the original video and improve its power of expression.

Newly-developed CXD4736GB that is the subject of this article has evolved the pattern classification procedure of this unique "database-type super-resolution" technology by adding a "learning function" that improves the classification function and dramatically enhances the picture quality of the generated video.

The "learning function" groups patterns produced by multidimensional features more efficiently in classifying the numerous characteristics that make up an image into a number of patterns and makes possible pattern classification according to the dynamic changes caused by input signal characteristics.

This makes it possible to appropriately classify input video (or image) depending on its characteristics to enable optimum super-resolution processing.

In conventional high-picture quality processing, signals are processed based on signal degradation occurring during shooting and transmission while our optimization of high-quality picture processing also considers the characteristics of the video display device. The CXD4736GB contains a database of LCD TV, projector and other display device characteristics to enable optimum super-resolution processing that guarantees both high picture quality and low noise.

The up-converter function employed in the super-resolution technology described above can convert full HD input to QFHD (3,840 × 2,160 pixels) or to 4K (4,096 × 2,160 pixels) high-resolution video output. The chip can also handle full HD as well as QFHD, or 4K video input. It can perform super-resolution processing also of 4K video input. In addition, color gamut conversion, dynamic contrast control and other image adjustment functions are provided to generate high-resolution and realistic 4K video.

Graphics data can be input and embedded with 4K video and all the signal processing required for a 4K video device is provided. (See figure 2.)

All this functionality in a single chip makes it comparatively easy to configure 4K LCD TV, projector and other display device systems using conventional full HD LCD TV and projector systems by adding the CXD4736GB.

All members of the development team worked hard to design this chip. The IC integrates so many proprietary technologies and functions from Sony, such as super-resolution technology, noise reduction and picture quality control functions required for high picture quality that we are convinced you need to look no further. This CXD4736GB comes with the capability to build awesome 4K video content.
**Figure 1** Super-resolution Processing Overview

- **Video signal processing flow**
  - Real-time picture quality measurement
  - Bandwidth division 3D noise reduction processing
  - Pattern classification based on "learning function"
  - Database conversion tailored to optical characteristics
  - Super-resolution processing control based on measurement of input picture quality

**Figure 2** Block Diagram

**Figure 3** Application Configuration Example

**Figure 4** Video Comparison