



# PRODUCT INFORMATION

Vol.89

## Video Signal-Processing IC for LCD TVs Developed

### Conversion of NTSC to XGA quality using resolution conversion technology for the first time in the industry

#### LC74980W

#### Overview

The flat panel market has recently become extremely active, with new LCD, PDP, FED (field emission display), and EL (electroluminescence) products appearing one after another. In particular, LCD panels are being used in an ever expanding range of products, such as notebook PCs, desktop PC monitors, and TV sets. In the LCD TV area, a market that first showed rapid growth in 1998, consumers and manufacturers alike are now looking forward to the appearance of popularly-priced products such as wall-mounting TV sets and paper-thin TV sets that take advantage of the merits of flat panel displays, such as their space saving and energy saving characteristics and their light weight.

However, to apply the improvements in LCD panel performance, in particular the improved viewing angles, increased brightness, and faster response times, to direct-display large-screen flat panels used for TV sets, the NTSC scanning technique—interlaced scanning, in which every other line is displayed—must be converted to the LCD panel scanning technique—progressive scanning, in which lines are displayed sequentially.

Sanyo has now developed the industry's first IC, the LC74980W, that can convert a standard TV signal to a video signal appropriate for an XGA resolution (1024 × 768 dots) LCD panel. The LC74980W is based on the know-how Sanyo acquired developing its earlier PC to NTSC scan converter ICs, and adds newly-developed video conversion technologies, support for multiple signal sources, and image quality enhancing technology to achieve an image quality appropriate for LCD panels.

This newly-developed resolution conversion technology supports both interlaced and progressive scan input signals, achieves a smooth enlargement effect with a perfectly natural appearance, and creates a high image quality XGA progressive scan signal appropriate for current LCD panels.

The multiple signal source feature supports both NTSC and PAL standard TV signals, and can also convert non-standard signals used in VCR special playback modes to XGA resolution. It also supports the 480I and 480P digital TV broadcast formats.

The LC74980W image quality enhancing technology allows end product to provide a full complement of adjustment functions for optimal image display of TV images based on multiple image quality adjustments. For example, the display characteristics of LCD panels involve deviations from linearity



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due to the properties of the LCD panel itself. The LC74980W includes programmable  $\gamma$ -correction functions for each of the RGB colors, thus allowing applications to achieve optimal color reproduction.

The development of the LC74980W brings the cost reductions associated with single chip integration to this area as well, and allows LCD TV set products to be created easily.

## Features

- Resolution conversion technology: The LC74980W supports both interlaced and progressive scan input signals, and converts its input to a high image quality XGA progressive scan signal appropriate for recent LCD panels.
- Multiple source support: In addition to NTSC and PAL inputs, the LC74980W also converts the non-standard signals used in VCR special playback modes to an XGA resolution video signal. It also supports the DTV 480I and 480P standards.
- Image quality enhancing technology: In addition to a full complement of image quality adjustments, including sharpness, color, color phase, contrast, brightness, white balance, and black balance, the LC74980W also provides independently programmable  $\gamma$ -correction for each of the RGB colors.
- Other features
  - OSD controller: Allows the adjustment controls to be displayed on the TV itself. (OSD: on-screen display)
  - Dither processing: Allows the equivalent of 16 million colors to be displayed by gradation enhancement technology.
  - I<sup>2</sup>C bus
  - Supports 5 V inputs

## Specifications and Functions

### Input Signals

- NTSC and PAL
  - YUV digital 8-bit signals
  - Supports point sequential multiplexed 8-bit signals for UV.
- Digital TV (480I and 480P)
  - YCbCr digital 8-bit signals
- Synchronizing signal: Component synchronizing signals
- Blanking signal: Component or composite signals
- Clock input

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## **Output Signals**

- XGA output: RGB digital in 6-bit units/2-phase signal
- Synchronizing signal: Component or composite signals
- Blanking output: Component or composite signals
- Clock output: Both single-phase and 2-phase clocks are output.

## **Control**

- I<sup>2</sup>C control (Allows internal registers to be set and status information to be output.)
- Three-wire bus (for OSD functions and  $\gamma$ -correction control)

## **Other Specifications**

- Supply voltage: 3.3 V
- Maximum operating frequency: 65.0 MHz
- Package: SQFP208

## **Sample Availability**

The LC74980W will be available in sample quantities by December 1999 and in production quantities by March 2000.

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