

# LCD Flat Panel Processor with built-in MCU, NTSC/PAL/SECAM Decoder, T-CON and Analog RGB Support

## TW8816

The TW8816 is a highly integrated multi-purpose LCD display solution for both analog and digital panels. To reduce BOM cost, TW8816 integrates an 8-bit MCU and a CCFL controller. Through multiple input ports, TW8816 can directly display video and graphic content from a variety of devices including TV Tuners, DVD players, back-up cameras, DTV/DMB receivers and navigation/GPS receivers.

## Features

- Supports analog inputs including CVBS, S-Video, YPbPr & RGB signals and digital inputs including 24 bit RGB & 8/16/24 bit YCbCr. Interlaced and progressive ITU 601 inputs are supported.
- Supports digital panels up to WXGA resolutions
- Integrates cost saving features including a CCFL controller, charge pump booster, programmable panel offset control and on-chip 8 bit 8051 MCU with SPI interface
- Embedded Image Enhancement
  - Programmable CTI, hue, brightness, saturation, contrast & sharpness control
  - Black/White Stretch
  - Programmable favorite color enhancement- up to three colors
  - Programmable Gamma Correction tables

## Features List

### Analog Video Decoder

- NTSC (M, 4.34) and PAL (B, D, G, H, I, M, N, N combination), PAL (60), SECAM with automatic format detection
- Advanced synchronization processing for VCR trick play signal
- Three 10-bit ADCs and analog clamping circuit.
- Built-in analog anti-aliasing filter
- Fully programmable static gain or automatic gain control for the Y or CVBS channel
- Programmable white peak control for the Y or CVBS channel
- Software selectable analog inputs allows any of the following
  - Up to 4 composite video
  - UP to 3 S-Video
  - Up to 2 analog YPbPr and RGB
- 4-H adaptive comb filter Y/C separation
- PAL delay line for color phase error correction
- Digital PLL for both color and horizontal locking
- Programmable hue, brightness, saturation, contrast, sharpness, Gamma control, and noise suppression
- Automatic color control and color killer
- Detection of level of copy protection according to Macrovision standard

### Analog RGB / YPbPr input

- Built-in sync processor for SOG support
- Built-in Line-locked PLL
- Built-in input measurement function
- Support directly sampling up to SVGA(50MHz).

### Digital interface

- Allows connection to 8/16/24-bit RGB/YCbCr
- Support interlaced
- ITU 656, interlaced and progressive ITU 601.

## TFT Panel Support

- Supports a variety of Digital single pixel TFT panels and Analog active matrix TFT panels
- Supports digital TTL panel up to WXGA(1280 x 768), 100MHz and analog panel up to WQVGA (480 x 234), 20 MHz
- Supports 3, 4, 6 or 8 bits per pixel format

## Built-in Microcontroller

- Supports external SPI Interface and I2C Master interface with GPIO
- Supports 8 MCU GPIO
- Supports UART interface with GPIO
- Support IR or interrupt with GPIO

## CCFL Controller

- Single channel CCFL controller based on push-pull architecture
- Lamp fault monitoring- Lamp Open, Lamp Over-current, Failure to Strike and Over-voltage
- Programmable Lamp Frequency to move EMI spurs out of band
- Analog or digital brightness control. 300:1 dimming range with the digital brightness control.
- Low power stand-by mode

## OSD

- Built-in OSD controller with integrated character 202 ROM and programmable 227 RAM fonts.
- Multi-window (4) OSD support with color pallet
- 16 font & window colors available
- Support OSD overlay with alpha blending

## Image Enhancement

- Programmable hue, brightness, saturation, and contrast controls.
- Sharpness control with vertical peaking
- Programmable
- CTI control
- Built-in de-interlacing engine
- Independent RGB gain and offset controls
- Panorama / Water-glass scaling
- YCbCr hue adjustment
- Programmable Gamma correction tables
- Programmable favorite color enhancement

## Power Management

- Supports Panel power sequencing.
- Supports DPMS for monitor power management.
- 1.8 / 3.3 V operation

## Timing Controller (TCON)

- Support programmable interface signals for control
- Column (source) driver / row (gate) driver

## Miscellaneous

- Supports 2-wire serial bus interface
- Spread spectrum PLL
- Low-speed ADC for KEY scan
- Programmable panel VCOM offset control
- 5V tolerant I/O
- Power-down mode
- Typical power consumption < 500mW
- Single 27MHz crystal

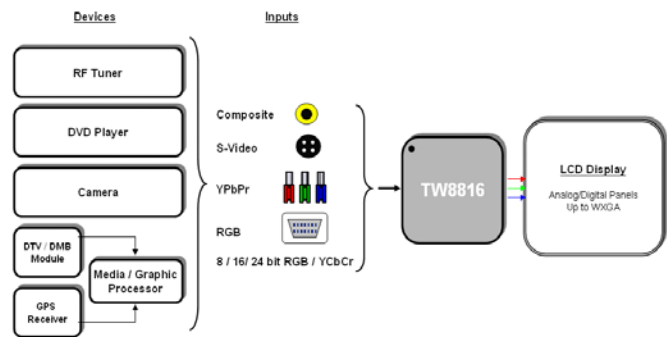


FIGURE 1. TYPICAL DIAGRAM

For additional products, see [www.intersil.com/en/products.html](http://www.intersil.com/en/products.html)

Intersil products are manufactured, assembled and tested utilizing ISO9001 quality systems as noted in the quality certifications found at [www.intersil.com/en/support/qualandreliability.html](http://www.intersil.com/en/support/qualandreliability.html)

Intersil products are sold by description only. Intersil Corporation reserves the right to make changes in circuit design, software and/or specifications at any time without notice. Accordingly, the reader is cautioned to verify that data sheets are current before placing orders. Information furnished by Intersil is believed to be accurate and reliable. However, no responsibility is assumed by Intersil or its subsidiaries for its use; nor for any infringements of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Intersil or its subsidiaries.

For information regarding Intersil Corporation and its products, see [www.intersil.com](http://www.intersil.com)