TW8816B3

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

FN7794
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General Description

The TW8816B3 is a highly integrated multi-purpose LCD display solution for both analog and digital panels. To reduce BOM cost, TW8816B3 integrates an 8-bit MCU and a CCFL or LED controller. Through multiple input ports, TW8816B3 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, and RGB signals and digital inputs including 24 bit RGB and 8/16/24 bit YCbCr. Interlaced and progressive ITU 656 inputs are supported.
- Supports both digital and analog panels up to WXGA resolutions
- Integrates cost saving features including LED controller, CCFL controller, programmable panel offset control, and on-chip 8-bit 8051 MCU with SPI interface
- Embedded Image Enhancement
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  - Programmable CTI, hue, brightness, saturation, contrast, and sharpness control
  - Black/White Stretch
  - Programmable favorite color enhancement- up to three colors
  - Programmable Gamma Correction tables

Analog Video Decoder

- NTSC (M, 4.43) 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

Analog RGB / YPbPr Input

- Built-in sync processor for SOG support
- Built-in Line-locked PLL supporting up to 108MHz
- Built-in input measurement function

Digital Interface

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

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 I^2C Master interface with GPIO
- Supports 8 MCU GPIO, 1 UART (up to 9600bps)
- Support IR or interrupt with GPIO

CCFL and LED 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
- Fine dimming control step (128 steps)

OSD

- Built-in OSD controller with integrated character 202 ROM fonts, programmable 227 RAM fonts and 512 characters display RAM.
- Multi-window (4) OSD support with color pallet
- 16 font and 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
- DFT
- Typical power consumption < 500mW
- Single 27MHz crystal

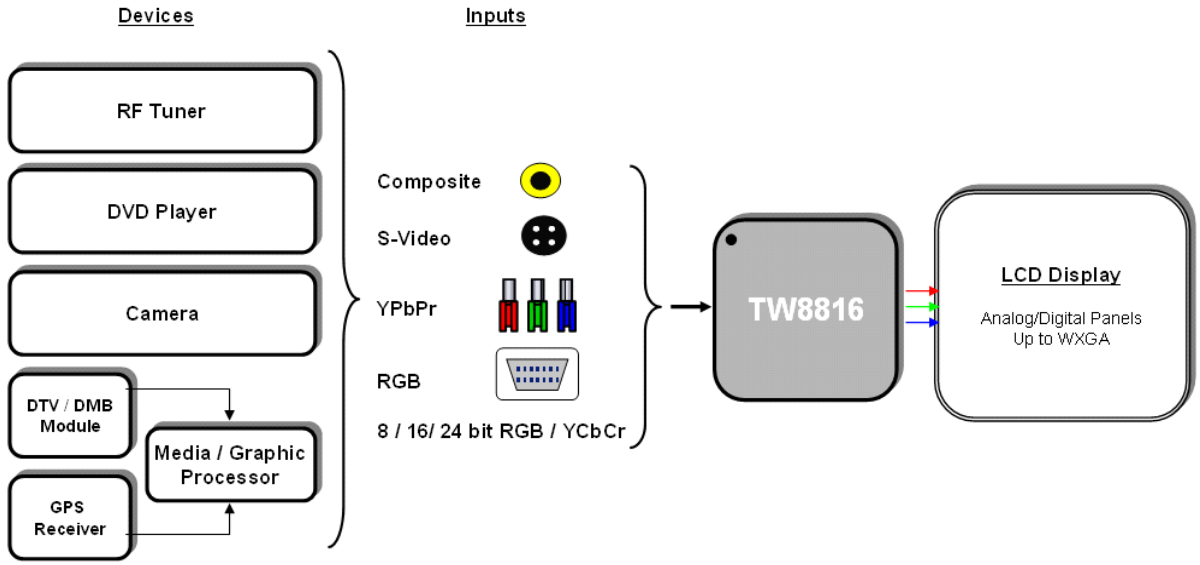

FIGURE 1. TYPICAL DIAGRAM