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Automotive Display ICs

TW8816

Highly integrated LCD controller with on-chip MCU & CCFL controller

The TW8816 is a highly integrated mutli-purpose LCD display solution with a high quality NTSC/PAL/SECAM 2D video decoder and a 2D De-interlacer/Scaler supporting digital and analog 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.

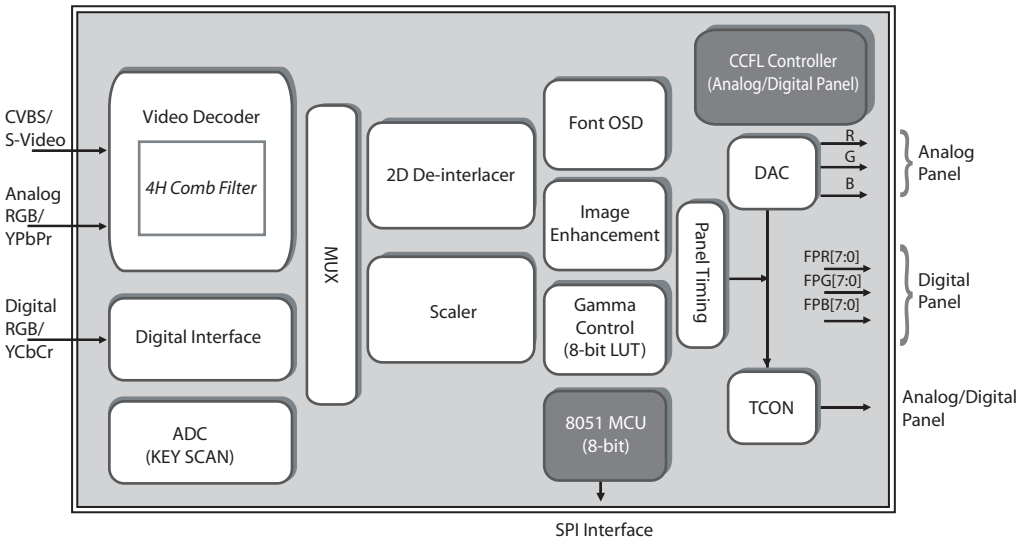
Target Applications

- Navigation + DVD + TV
- Back up Camera
- Rear Seat Entertainment
- Car TV
- Portable DVD
- PMP
- Portable TV
- Door Phone
- Photo Frame
- DMB TV
  Baby Monitor
- Home Audio
- In Flight Entertainment

Key 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 656 inputs are supported
- Supports both digital & analog panels up to WXGA resolutions
- Integrates cost saving features including a CCFL controller & an on-chip 8-bit 8051 based MCU with SPI interface
- Built-in 8 colors Font OSD with 202 ROM and programmable 227 RAM fonts
- Supports Multi-color fonts by combining 3 single color fonts
- 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

TW8816 Functional Block Diagram



Order Information

Part #	Name	Description	Pin Count	Body Size
TW8816	LQFP 128	Low Profile Quad Flat Package	128	14 x 20 mm^2

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with on-chip MCU & CCFL controller

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

8/16/24-bits Digital RGB/YCbCr Inputs

- 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

Font OSD

- Built-in Font OSD with 202 ROM and programmable 227 RAM fonts. Supports Multi-color fonts by combining 3 single color fonts
- Multi-window (4) OSD support with color pallet
- 16 font & window colors available
- Support OSD overlay with alpha blending

Built-in Microcontroller

- Supports external SPI Interface and I2C Master interface with 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

Image Processing & Enhancement

- Built-in 2D de-interlacing engine
- Built-in high quality scalar
- Programmable hue, brightness, saturation, and contrast controls
- Sharpness control with vertical peaking
- Programmable CTI control
- Independent RGB gain and offset controls
- Panorama / Water-glass scaling
- YCbCr hue adjustment
- Programmable Gamma correction tables

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

- Temperature rating: -40 C to +85 C
- 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

About Techwell

Techwell is a fabless semiconductor company that designs, markets and sells mixed signal integrated circuits for multiple digital video applications in the consumer, security surveillance and automotive markets, including advanced TVs, multifunction LCD monitors, DVD Recorders, security surveillance systems and in-car LCD displays. Founded in 1997, we currently have over 125 employees and are headquartered in San Jose, California, with additional R&D and sales activities in South Korea, Japan, Taiwan and China. NASDAQ: TWLL

For more information on Techwell, please contact us at 1-408-435-3888

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