

## Automotive Display ICs

# TW8813

3D Video Decoder based LCD controller  
with built-in LVDS panel interface



TECHWELL  
DISPLAY



TW8813 is a highly integrated and flexible LCD controller for the automotive infotainment market, including front console and rear seat entertainment applications. TW8813 integrates an 8-bit LVDS panel interface to support digital panels up to 720p resolution. TW8813 also embeds a built-in high quality 3D video decoder, 2D Scaler/De-interlacer, TCON, panel back-light controllers and bit-map OSD engine in a single package. TW8813 supports a variety of analog inputs and adds flexibility by supporting two Digital RGB input ports.

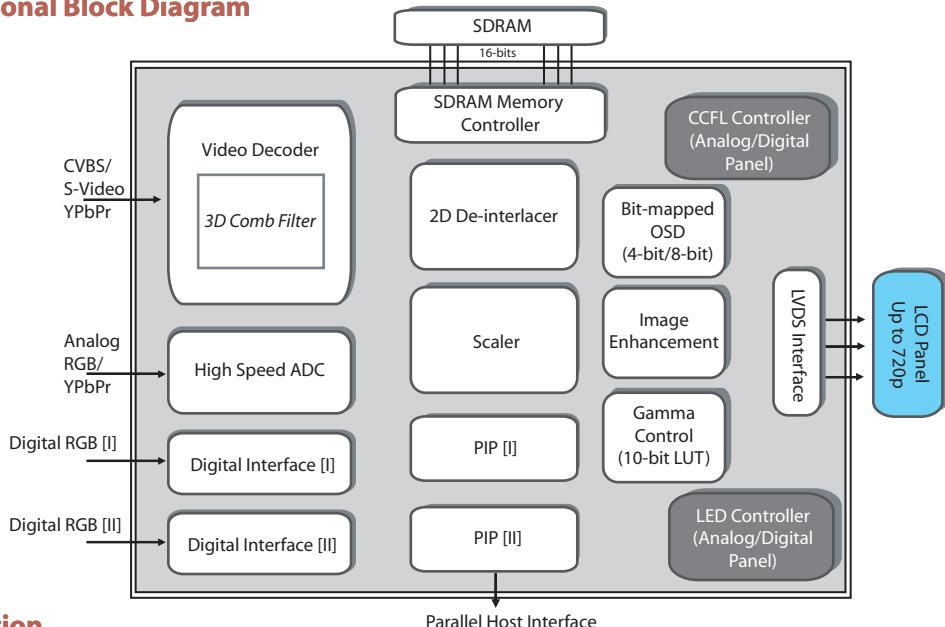
## Target Applications

- Navigation + DVD + TV
- Back up Camera
- Rear Seat Entertainment
- Car TV
- Portable DVD player
- Portable TV
- In Flight Entertainment

## Key Features

- Supports analog inputs including CVBS, S-Video & Analog RGB/YPbPr. Supports single 24-bits Digital RGB input or Dual 18-bits Digital RGB inputs. Both interlaced & progressive ITU 656 and 601 formats supported
- LVDS panel interface can support digital panels with resolutions up to 720p
- Integrated 16-bits SDRAM memory controller supporting external SDRAM up to 8MB
- Built-in 2 PIP engines
- Built-in dual window bit-mapped (4/8-bits) OSD
- External 18-bits OSD supported with alpha blending control
- Embedded Image Enhancement:
  - Programmable CTI, hue, brightness, saturation, contrast and sharpness control
  - Black/White Stretch
  - Programmable favorite color enhancement- up to three colors (Skin, Grass and Sky)
  - Programmable Gamma Correction tables

## TW8813 Functional Block Diagram



## Order Information

Part #	Name	Description	Pin Count	Body Size
TW8813	LQFP 208	Low Profile Quad Flat Package	208	28 x 28 mm^2

## 3D 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
- Three 10-bit ADCs and analog clamping circuit.
- 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 combinations:
  - Up to 4 composite video
  - Up to 2 S-Video
  - Up to 1 YPbPr
- High quality motion adaptive 3D comb filter for both NTSC and PAL with concurrent 3D noise reduction
- PAL delay line for color phase error correction
- Image enhancement with 2D dynamic peaking and CTI
- Digital sub-carrier PLL for accurate color decoding
- Digital horizontal PLL and Advanced synchronization processing for VCR playback and weak signal performance
- Programmable hue, brightness, saturation, contrast, sharpness
- High quality horizontal and vertical filtered down scaling with arbitrary scale down ratio
- Detection of level of copy protection according to Macrovision standard
- Supports YPbPr input up to 1080i with sub-sampled resolution
- Support automatic standard detection for YPbPr input

## Analog RGB Inputs

- Triple high speed 8-bit ADCs with clamping and programmable gain amplifier.
- Up to two independent RGB / YPbPr channels with corresponding SOG
- Built-in line locked PLL with sync separator
- Allows high resolution components inputs like DTV 480i, 480p, 576i, 576p, 720p & 1080i
- Supports PC inputs up to SXGA

## 8/16/18/24-bits Digital Inputs

- Supports single 24-bits Digital RGB input port or Dual 18-bits Digital RGB input ports
- Allows connection with Video & PC graphics inputs
- Supports both 656 & 601 video formats
- Allows connection to HDMI receiver

## SDRAM (up to 8MB)

- Support 16-bit bus width SDRAM

## Clock Generation

- Frequency synthesizer with spread spectrum generate memory and display clocks
- Spread spectrum profile based on triangular modulation with center spread
- Modulation frequency and spread width can be selectable

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## Bit-map OSD

- Dual window 4-bit/8-bit bitmapped OSD
- Built-in OSD controller with BitBlit Engine
- Supports variety functions included like blinking, transparency and blending
- Supports External 18-bit OSD with external alpha blending control
- Support OSD compression

## PIP Engine

- Built-in 2 PIP engines with variable sub window size
- PIP overlay supported over main
- Support PIP alpha blending
- Built-in high quality down scaling engine

## Image Processing & Enhancement

- Built-in 2D de-interlacing engine
- Built-in high quality scaler with nonlinear scaling support- Panorama & Water-glass
- Programmable hue, brightness, saturation, contrast
- Sharpness control with vertical peaking
- Programmable color transient improvement control
- Supports programmable cropping of input video and graphics
- Independent RGB gain and offset controls
- DTV hue adjustment
- Programmable Gamma correction for each color
- Operated in Frame Sync mode only
- Black/White Stretch
- Programmable favorite color enhancement

## Host Interface

- Supports 2-wire serial bus interface
- Supports 8Bits Parallel Host Interface

## LVDS Panel Interface

- Supports 6 or 8 bits per pixel up to 16.8 million colors with built-in dithering engine
- Supports digital panels with resolutions up to 720p
- Power down mode
- Drives long, low cost cables

## Power Management

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

## Miscellaneous

- Power-down mode
- Temperature rating: -40 C to +85 C
- Single 27MHz crystal
- 208-pin LQFP package

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