

Introduction

The TW8801 incorporates all the features required to create multi-purpose LCD TV systems in a single package.

It contains all the circuits required to adapt standard NTSC/PAL/SECAM analog TV input signals for display on various TFT LCD panel types.

With one external IC it becomes both an LCD PC monitor controller and an HDTV controller.

Analog YPbPr / RGB and S-Video inputs allow direct connection to analog component sources found on DVD, PIP chips, and TTX decoder.

Digital TTL YCbCr, and RGB inputs allow digital TV, HDTV, or digital VGA monitor signals to be input for display on the same LCD display panel.

Techwell's TW8801 is an enhanced version of the TW88 flat panel LCD TV/PC monitor controller.

Primary enhancements include: 4H Comb Filter, downscaling to QVGA output resolution, digital progressive scan ITU 656 input including 422 and 444 input, one GAMMA lookup table per color, and a new 24-bit YCbCr/RGB port.

To further facilitate the move to wide screen displays, the TW8801 has the ability to show 4:3 images correctly proportioned and centered in a 16:9 displays.



Techwell's TW8801 PQFP package

Features

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 fast forward, backward, and pause mode
- Six 8-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 up to 4 composite video, or 2 S-Video, or 2 RGB or YPbPr component

Video Processing

- Switch able Notch or 2/4-H adaptive comb filter Y/C separation
- PAL delay line for color phase error correction
- Image enhancement with 2D peaking and CTI.
- Digital sub-carrier PLL for accurate color decoding
- Digital Horizontal PLL and advanced synchronization processing for non-standard video signals
- Programmable hue, brightness, saturation, contrast, sharpness, Gamma control, and noise suppression
- Automatic color control and color killer
- High quality horizontal and vertical filtered scaling with arbitrary scale down ratio
- Detection of level of copy protection according to Macrovision standard
- Soft Mixing process between component inputs and a CVBS input

24-bit Digital RGB and 8/16/24-bit YCbCr Inputs

- Allows connection to analog PC Graphics cards with the addition of a 3 channel A/D converter for up to SXGA resolution
- Allows YCbCr digital component input for DTV 480p, 720p, 1080i
- For connection to digital PC graphics cards (with the addition of a Panellink™ DVI interface receiver)

TFT Panel Support

- Supports a wide variety of active matrix TFT panels either one or two pixels per clock
- Supports panel with resolution up to SXGA (1280 x 1024)
- Supports 3, 4, 6 or 8 bits per pixel up to 16.8 million colors

On Screen Display

- Built-in OSD controller with integrated character ROM.
- Supports dedicated port for an optional external OSD controller.

Image Control

- Programmable hue, brightness, saturation, contrast
- Automatic color control and color killer
- Sharpness control with vertical peaking up to +12db
- Programmable color transient improvement control
- Supports programmable cropping of input video and graphics.
- High quality expansion for low-resolution graphics.
- Built-in video de-interlacing engine for correctly positioning of odd and even field.
- Independent RGB gain and offset controls
- DTV hue adjustment
- Programmable Gamma correction for each color
- Operated in Frame Sync mode only with no external memory required.
- Built-in YCbCr to RGB color space converter

Power Management

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

Miscellaneous

- Supports 2-wire serial bus interface
- 5V tolerant I/O
- Two wire MPU serial bus interface
- Power-down mode
- Typical power consumption 1W
- Single 27MHz crystal
- 160-pin PQFP package