TW8823C

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TFT Flat Panel Controller with Built-In 3D Video Decoder, Triple ADCs, Dual PIP, and 16-Bit OSD Support

The TW8823C incorporates many of the features required to create a multi-purpose in-car LCD display system into a single package. It integrates a high-quality 3D comb NTSC/PAL/SECAM video decoder, triple high speed RGB ADCs, high-quality scaler, bit-mapped OSD, triple DACs and image enhancement functions that include features such as Black and White Stretch and favorite color enhancement. It also supports panoramic scaling for conversion to wide screen display format. On the input side, it supports a rich combination of CVBS, S-video, analog RGB, and digital YCbCr/RGB. On the output side, it supports both digital and analog panel types with its built-in timing controller and analog RGB output. In addition, the TW8823C supports LVDS type panels.

The TW8823C also has two PIP (Picture-in-Picture) engines that can display three display sources simultaneously in a single window. It also has a built-in bit-mapped OSD with 16-bit color depth and an acceleration function. It can also accept 18-bit external OSD inputs. In addition, TW8823C has a built-in high-performance microcontroller with cache. Its SPI interface supports various serial flash types.

Features

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
- Two 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 either composite or S-video input
- 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

ANALOG RGB INPUTS

- Triple high-speed 10-bit ADCs with clamping and programmable gain amplifier
- SOG and H/V sync support for YPbPr or RGB input
- Built-in line locked PLL with sync separator
- Supports analog input resolution up to 1080i or WXGA

DUAL DIGITAL INPUTS SUPPORT

- Dual channel digital inputs support with following combination:
  - 1-channel 18/16-bit inputs and 1-channel 8-bit inputs
  - 1-channel 24-bit digital RGB/YCbCr inputs
- Supports both 656 and 601 video formats
- Allows connection to external HDMI receiver

BUILT-IN MICROCONTROLLER

- Built-in 8052 MCU up to 72MHz clock
- Built-in code cache memory to enhance CPU performance
- Supports Single/Dual/Quad IO SPI Flash with 24-bit/32-bit addressing
- System programming through UART
- Supports SPI DMA Read/Write to OSD memory
- Supports I^2C Master interface with GPIO
- Supports two UART interface up to 115200bps and 8 bytes RX FIFO
- Supports IR receiver and interrupt output
- Supports 24-bit contiguous addressing mode

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TFT PANEL SUPPORT

- Built-in both analog and digital timing controller with programmability
- Supports optional single channel LVDS panel with resolution up to WXGA, 80MHz
- Supports 3, 4, 6, or 8 bits per pixel up to 16.8 million colors with built-in dithering engine
- Supports analog panel with resolution up to WQVGA 20MHz

ON SCREEN DISPLAY

- Supports three window bitmapped OSD, one 16 bits and two 8 bits bitmap OSD
- Built-in OSD controller with Bit-Blit Engine
- Supports a variety of functions including blinking, transparency, and blending
- Supports External OSD with external alpha blending
- Supports OSD compression
- Supports window width up to 1366

IMAGE PROCESSING

- High quality scaler with both up/down and nonlinear scaling support
- Built-in 2D de-interlacing function
- Programmable hue, brightness, saturation, contrast
- Sharpness control with vertical peaking up to +12db
- Programmable color transient improvement control
- Programmable cropping of input video and graphics
- Independent RGB gain and offset controls
- Panorama/water-glass scaling
- DTV hue adjustment
- Programmable 10-bit Gamma correction for each color
- Operated in Frame Sync mode only
- Black/white stretch
- Programmable favorite color enhancement

PIP FUNCTION

- Two independent PIPs
- Variable sub-window size
- POP with alpha blending
- Supports both 16-bit YPbPr and RGB data format
- High quality up and down scaling engine for PIP

DDR-SDRAM

- Supports 16 bits 155MHz DDR-SDRAM up to 256Mb

HOST INTERFACE

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

CLOCK GENERATION

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

POWER MANAGEMENT

- Supports Panel power sequencing
- Supports DPMS for monitor power management
- 1.8/2.5V/3.3 V operation

MISCELLANEOUS

- Built-in single CCFL backlight controller
- Built-in single LED backlight controller
- Built-in touch screen controller with 12-bit ADC
- Power-down mode
- Single 27MHz crystal
- 216 Ld LQFP package
- TW8823AT-LC2-GE is AEC-Q100 qualified

Applications

- In-car display controller
- Portable DVD and DVRs players
- Portable media player

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Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu,
Koto-ku, Tokyo 135-0061, Japan
www.renesas.com

Contact Information

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