

SAA6740

Extending the Philips SAA67xx family of advanced TFT-LDC controller ICs, the SAA6740 integrates VGA and DVI inputs, a programmable panel TCON, and RSDS and TTL output signaling—lowering cost, weight, and power consumption in next-generation XGA digital display devices.



Key features

- > 110-MHz TFT-LCD controller
- > Maximum XGA output resolution (1024x768 pixels)
- > Integrated DVI-compliant TMDS receiver with HDCP
- > Integrated TCON with RSDS output interface
- > Integrated triple ADC for VGA interface
- > Philips enhancements improve picture quality and contrast
- > Advanced color processing
- > Programmable horizontal/vertical upscaling and downscaling
- > 10-bit gamma correction
- > Robust OSD features include enhanced character/bitmap OSD, rotation, flipping, and more
- > Standard 3.4-Mbit I²C interface
- > Easy-to-use PQFP128 package
- > Complete Reference Design Kit available

Dual-input XGA TFT-LCD controller with RSDS output



The Philips SAA6740 is a highly integrated, TFT-LCD controller IC. It inputs analog VGA and DVI 1.0-compliant TMDS signals with high-bandwidth digital content protection (HDCP) support, performs all needed signal processing and measurement, and outputs to an XGA LCD panel. The SAA6740's integrated timing controller (TCON) and support for reduced swing differential signal (RSDS) signaling offers significant advantages in next-generation digital display designs. By enabling direct interface to virtually any gate and RSDS source drivers, the SAA6740 makes it possible to build panels with reduced power usage, less EMI-radiated noise, fewer bus interconnects, and lower overall weight and system cost than traditional TTL flat panels. RSDS support makes SAA6740 an ideal solution for PC desktop monitors.

Enhanced picture quality

The SAA6740 controller leverages the extensive picture-improvement features of previous Philips SAA67xx TFT-LCD controllers to enhance picture quality and optimize contrast. A programmable polyphase filter enables picture adjustment from smoothing to sharpening during upscaling. Sophisticated color management features include a programmable color matrix, temporal dithering for 10 bits of virtual precision on six- and eight-bit displays, and 10-bit gamma correction.

Advanced OSD features

The SAA6740's integrated, feature-rich on-screen display (OSD) functionality facilitates creation of a smart and user-friendly graphical user interface and improves text readability. It supports character-based features, including predefined and programmable fonts, as well as a bitmapped graphical OSD.

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Technical specifications

Input interfaces

- > DVI 1.0-compliant TMDS input including HDCP, 110 MHz
- > 110-MHz analog VGA input with clamp and automatic gain control
- > maximum input resolution: 1280x1024 pixels

Input auto detection

- > detection of presence and polarities of sync signals
- > measurement of horizontal and vertical update frequencies
- > statistical measurements assist in adjustment of sample clock frequency, vertical and horizontal sample offset, and ADC parameters

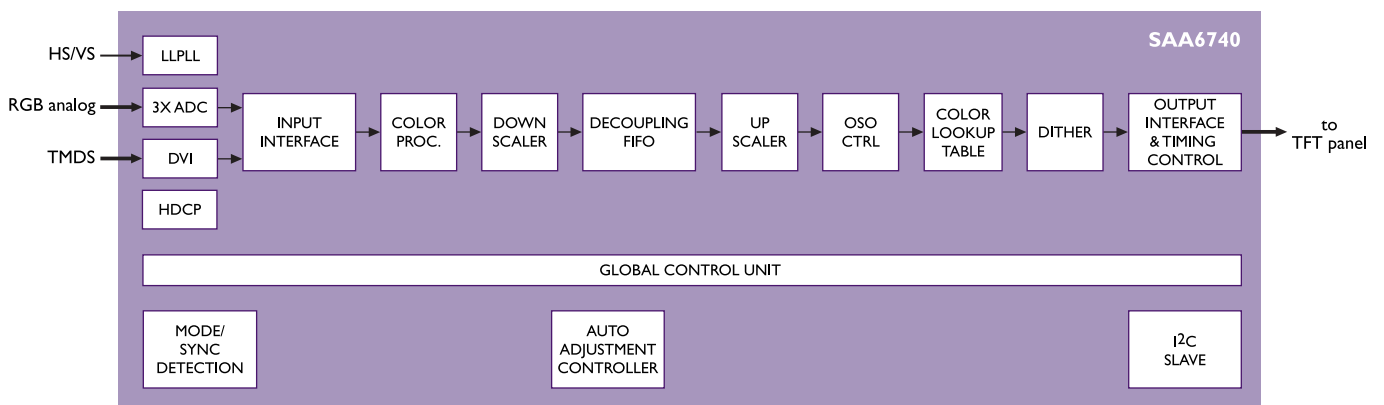
Input processing

- > advanced color processing for luminance, separate color saturation, and R, G, and B contrast and brightness
- > phase-correct downscaling of any input data

OSD

- > programmable character size from 8x8 to 32x32
- > predefined character ROM including 256 characters (icons, etc.)
- > 144 built-in character size-independent generators for borders and sliders
- > OSD rotation (90° steps)
- > built-in 4-kB memory for up to 512 additional user definable/downloadable characters of up to 4 colors
- > selectable true-color sets for characters and bit-mapped OSD
- > 4-kB bitmapped image RAM, 2 to 16 colors, for backdrop or company logo, etc.
- > programmable alpha blending for OSD and image windows
- > double-buffered cursor/pointer RAM (enables Windows®-like cursor) for animation
- > text attributes such as shadowing, blinking, inversion, and foreground/background transparency

SAA6740 Conceptual Block Diagram



Output processing

- > upscaler with independent vertical/horizontal parameters
- > arbitrary upscale ratio from 1 to 64
- > programmable polyphase filter supports picture adjustments from smoothing to sharpening
- > color correction lookup table (256x10 bits, e.g. for gamma correction)
- > temporal dithering for 10-bit virtual precision on 8- and 6-bit displays

Output interface

- > single-bus RSDS interface, 6 or 8 bits per color (9 or 12 data channels)
- > TTL output (24-bit single edge, 12-bit dual edge)
- > programmable output timing supports displays of virtually any manufacturer
- > direct interface to common gate and RSDS source drivers
- > panel interface with programmable drive strength for EMI reduction
- > maximum output resolution: 1024x768 pixels at 80 Mpixel/s

SAA6740 family compatibility

- > all SAA6740 models are pin and register compatible
- > SAA6740A: analog interface XGA
- > SAA6740B: digital interface XGA



Complete reference design kit available, includes:

- > main board housing the SAA6740 IC and P89C51LCD micro-controller with built-in Flash (or third-party equivalent)
- > a keyboard
- > LCD panel-connection accessories
- > complete reference software and software library support for developing a full LCD monitor application

Packaging

- > PQFP128 package

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