



HIGHLY INTEGRATED LCD TV PROCESSOR

1. GENERAL DESCRIPTION

The SPV7100A is a highly integrated solution for the mainstream LCD TV applications. The SPV7100A provides on-chip functions including a high-speed triple-ADC and PLL, HDMI **PanelLink™** Cinema receiver, TV decoder with 3-D comb filter, 4-pair Audio Line-In, 2-pair Audio Line-Out, one SIF demodulator and audio decoder, 3D motion adaptive de-interlacing, 2:2/3:2 film mode detection, video on graphic PIP/POP, SDRAM/DDR controller, color management control, sRGB color management, bitmap-based and font-based OSD engine, embedded CPU and a dual channels LVDS transmitter. The chip could support LCD TV up to 1080P input resolution and 1080p output resolution.

Note: PanelLink is the Trade Mark of Silicon Image Inc.

2. FEATURES

2.1. Graphics and Video Input Port

- Integrate 150MHz 10-bit ADC/PLL
- Dual CCIR656 digital video ports to support 2 input or 1 input/1 output
- Support SDTV at 480i/576i and 480p/576p
- Support HDTV at 720p and 1080i and 1080p
- Support PC graphics VGA, SVGA, XGA, WXGA, SXGA@75Hz (135MHz)
- Build-in sync. processor for separate, composite or sync on Y/G
- Support Video/Graphics PIP/DW
- Channel swap for any source input
- Image Format Detection/Auto Image Positioning/Auto Phase Detection
- Full SCART support including RGB fast blank

2.2. HDMI

- HDMI 1.2 compliant and DVI 1.0 compliant receiver
- HDCP 1.1 compliant receiver
- Support DTV resolutions (480i/576i/480p/576p/720p/1080i/1080p)
- S/PDIF output supports PCM, Dolby Digital, DTS digital audio with bypass mode
- Four I2S audio outputs to SSD(Stereo Sound Decoder) with bypass mode
- Auto audio error detection with programmable soft mute
- Build-in OTP for HDCP key

2.3. 3D Video Decoder

- NTSC/PAL/SECAM video decoder
- 3D comb filter for NTSC, PAL I (B,G,H,D,N), PAL-M, PAL-N
- Enhanced NTSC/PAL/SECAM auto detection
- 4 analog inputs and one analog video output
- Cross-color reduction for NTSC by 3-line comb filtering
- Cross-color reduction for PAL by 5-line comb filtering
- Motion adaptive 3D Y/C separation comb filter for NTSC/PAL system
- Multi-standard VBI data decoder, Teletext 2.5, WSS, VPS, Closed-caption and V-chip
- Macrovision detection
- VBI data (C.C, TTX2.5, V-chip) overlay display

2.4. High Quality Video Processing

- Enhanced Pixel-based 3D motion adaptive de-interlacing (SDTV/HDTV)
- Enhanced 2:2/3:2 film mode detection
- Support Graphics mode frame rate conversion
- Support Video mode frame rate conversion
- 2D Edge enhancement
- Dynamic Peaking Filter
- Enhanced Digital Luminance Transient Improvement (DLTI)
- Digital Color Transient Improvement (DCTI)
- Black/White Level Expansion and Dynamic Contrast
- RGBYMC color adjustment
- Dark and Gray area UV Suppression
- Enhanced 3D motion adaptive noise reduction
- De-blocking and de-mosquito filters
- Color management/Color temperature adjustment
- Brightness/Contrast/hue/Saturation adjustment
- Support sRGB color correction
- Build-in three 256-point gamma tables with 10 bits resolution
- Color space conversion, both YCbCr to RGB and RGB to YCbCr
- Build-in temporal/spatial color dithering
- 10-bit video/image processing

2.5. High Quality Video Scaling Engine

- Advanced third-generation scaling engine
- Support 4:3 / 16:9 with non-linear scaling
- Support Moiré Canceling



2.6. Multi-standard TV Sound Decoder

- Field proven TV sound decoder
- Support BTSC, A2/Zweiton, NICAM, EIAJ, SECAM, FM stereo
- Automatic TV-standard detection (ASD)
- Non-standard carrier compatible
- SAP decoding where applicable
- Auto fallback from NICAM where applicable

2.7. Embedded OSD and VBI Controller

- Build-in programmable OSD engine for two OSD windows (bit map OSD)
- 1,2,4 and 8-bit per pixel (bit-map OSD)
- Support hardware cursor
- Support programmable 512 font-based OSD and graphics-based OSD
- Support VBI decoder (CC,V-Chip and Teletext)
- Support VBI CC/TTX/Menu with more than 1000 char-fonts

2.8. Embedded DDR/SDRAM Controller

- Integrated DDR/SDRAM controller with DLL (DDR)
- Support 32-bit DRAM bus with memory size from 16Mb (limited functions) to 256Mb

2.9. Programmable Digital Output for LCD

- Support output sequence mapping for TI and Thine
- Build-in dual channels 8-bit LVDS Tx or single channel 10-bit LVDS Tx
- Support display output up to 1920x1200 @60Hz (165Mhz WUXGA reduced blanking)
- Support Power Down Sequence
- 4-ch PWM backlight intensity control

2.10. CPU

- Powerful 32-bit RISC CPU
- Simple memory management stub (SMMU)

- MIPS-I instruction with DSP instruction set extension
- 2K bytes 2-way instruction cache
- 4K bytes direct-mapped data cache
- 8K bytes data memory for DMA operation
- EJTAG interface
- One UART up to 115200 baud rate
- Four 24-bit up/down timers
- 3K Bytes IMem for power saving mode

2.11. Audio Processor

- Support SPDIF input
- Support SPDIF output (signal could come from SPDIF input or SSD)
- Support up to 8 channels I2S I/O
- 4 channels audio DAC output
- 4 channels audio ADC input
- Channel: L, R, C, S, Sub, Aux1, 2 and 3 @ 32 kHz
- 5- band Equalizer
- 3-D surround sound
- Bass management
- Volume control
- Support sub-woofer output
- Sample rate conversion
- SSD could output up to 3 sources
- Virtual Dolby Surround (VDSII 422 and 423) (support by SPV7100AxD)
- SRS TruSurround (XT, WOW, 3D Sound) (support by SPV7100 AxS)

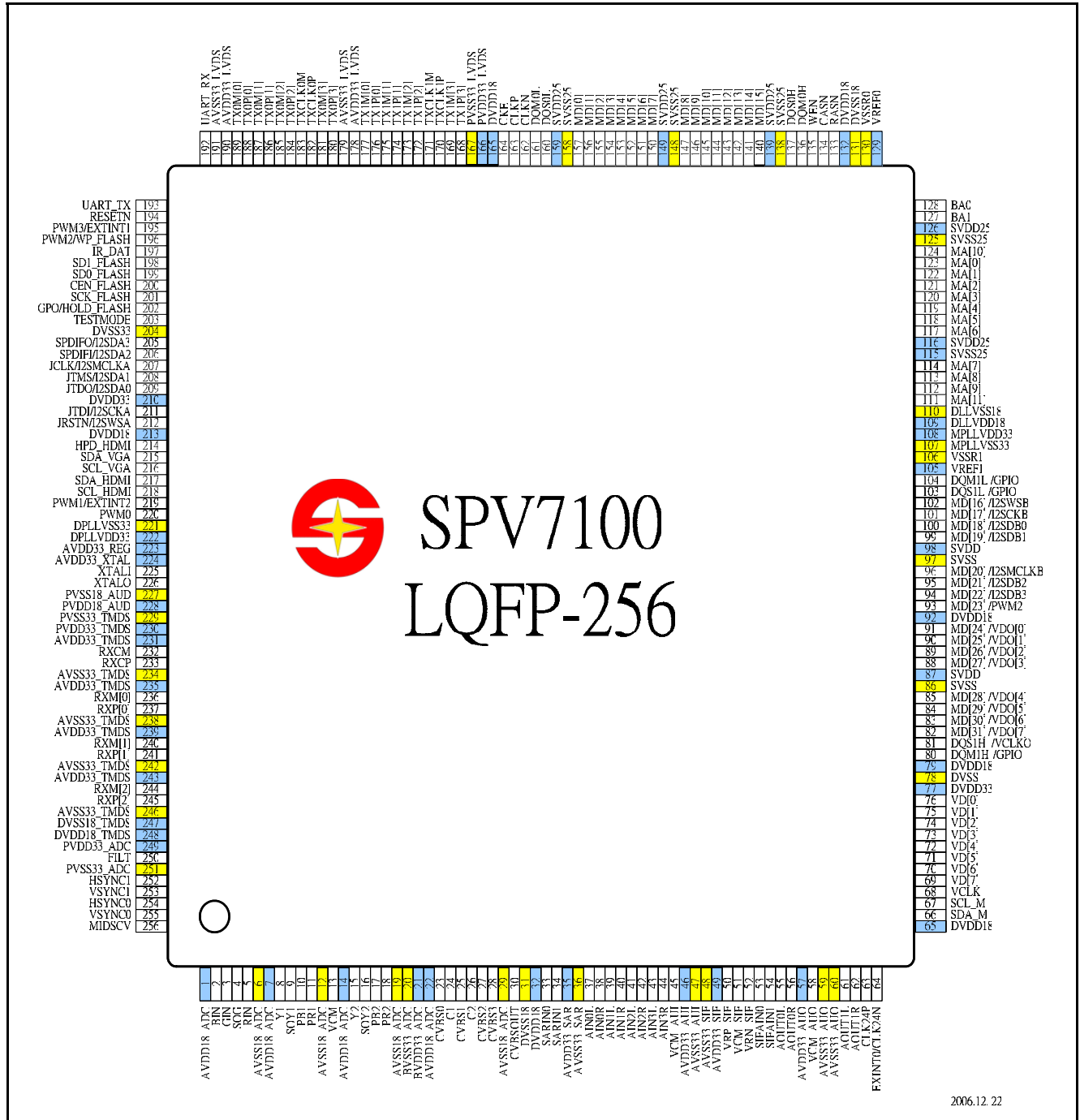
2.12. Misc

- Build-in TV remote control 1 infra-red receiver interface
- 2-channels 6-bits ADC for key scan function
- Build-in pattern generator for auto testing
- 256-pin LQFP for LCD application



4.3. List of Packages and Pins

4.3.1. 256- LQFP Package



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Figure 4-1 SPV7100A Pin Configuration