SVP™EX

Super Video Signal Processor

OVERVIEW

The SVP™EX video processor is a highly integrated system-on-a-chip device, targeting the converging HDTV-ready and PC-ready digital CRT TV, LCD TV, and PDP TV, and DLP TV applications where high precision processing of video and data are the requirements. SVP™EX contains a dual-purposed triple 10-bit high-precision and high-speed video ADCs for both PC and video inputs, a high-performance 4th generation multi-format 3D digital-comb video decoder that supports NTSC, PAL and SECAM*, an HDTV sync separator, motion adaptive de-interlacing engine, and the video format conversion engine, supporting many output modes, picture-in-picture (PIP), multi-window and picture-on-picture display modes.

Trident's DCRE™ engine--digital cinerma reality engine, is integrated inside the SVP™EX to provide the most natural cinema-realistic images. The DCRE™ technology integrates advanced 3D-comb video decoding, advanced motion adaptive de-interlacing, object-based digital noise reduction, cubic^4 image scaling, film mode support, average picture level (APL), edge smoothing and dynamic sharpness enhancement. Trident's patented Unified Memory Architecture (UMA) that allows frame rate conversion, 3D comb video decoding, and video enhancement processing to share the same frame buffer memory made up of high-speed and cost-effective PC graphic memory. All these advanced digital processing techniques combined with a true 10-bit video data processing for the most optimal video fidelity to provide the most natural and cinema quality video images.

Designed for maximum system design flexibility, SVP™EX iintegrates all video interfaces to support converging digital video, analog video, and PC data applications. The users of Trident's single chip SVP™EX video processor(s) will benefit from many features while maintaining a price competitive advantage over the existing solution(s).

* In SECAM, SVP™EX video decoding mode is only 2D

INPUTS/OUTPUTS

| Analog Video Inputs	• CVBS • S-Video • DTV YPbPr Videos in D1 (480I), D2 (480P), D3 (1080i), D4 (720P) • Analog PC RGB inputs up to 1280x1024x60 Hz • SCART input with C-sync (CVBS) and Teletext • Support 1080i bypass mode
Digital Video Inputs	• 8-bit CCIR 656 • 16-bit CCIR 601, CCIR 709 • 24-bit YUV/RGB
Analog Outputs	• RGB up to SXGA (1280x1024x60) resolution • sRGB output • Direct YPbPr output with 525/625P Macrovision Copy Protection
Digital Outputs	• Single channel LVDS • 8/16/24-bit digital output • CCIR656, CCIR601, CCIR709 outputs

DESCRIPTIONS

Integrated 4th Generation NTSC/PAL/SECAM Video Decoder With 3D Comb YC Digital Filter

- Automatic seamless 3D and 2D mode switching
- Advanced Unified Memory Architecture
- Built-in VBI Slicer for Closed Caption and V-chip
- On-chip sync separator for SOY (Sync on Y) and SOG (Sync on Green) signal input
- Video brightness, contrast, saturation, hue, & sharpness adjustment
- High precision 10-bit ADC analog front-end
- Enhanced dual-channel, frame-recursive YC noise reduction

4th Generation Advanced Digital Video Processing and Picture Enhancement

- 4th generation adaptive edge smoothing algorithm for enhancing image clarity and sharpness
- Advanced film mode recovery with fast response bad-edit detection
- Pixel-based motion and edge adaptive de-interlacing
- Advanced motion-adaptive 1080p with Film Mode support
- Advanced dual channel Digital Noise Reduction Y/C
- Adaptive black and white extension
- Hardware accelerated bi-cubic filtering for up and down video scaling
- Support Picture-In-Picture (PIP), Picture-out-Picture (POP), multi-picture window, and panorama display modes
- SVGA digital/analog overlay with OSD and PIP
- Programmable zoom viewer with linear and non-linear vertical and horizontal panorama scaling
- RGB Stretch to make the sky bluer & the grass greener
- Gamma Correction with 10-bit gamma table correction (LUT)
- Dual channel Inverse Color Space Conversion (ICSC) from RGB to YUV

SVP™EX Application Diagram

Trident
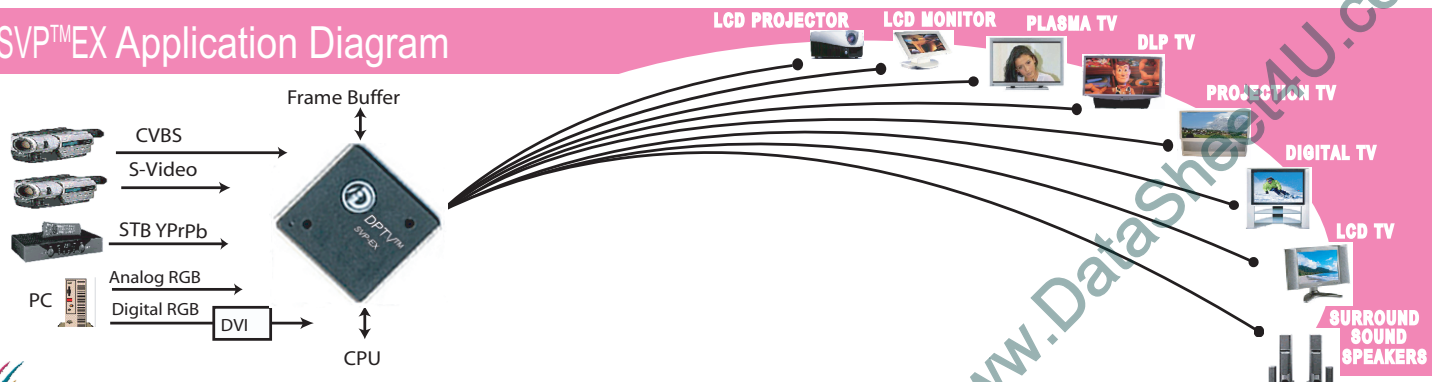
Super Video Signal Processor

- Programmable skin tone enhancement
- Alpha blending
- 16/20-bit LCD dithering
- Vertical Keystone Scaling
- Scan Velocity Modulation

Frame Rate Conversion

- Support SD and HD video input (480i, 480p, 1080i, 720p) with auto mode detection
- Programmable vertical blanking timing
- Support progressive and interlace refresh scan rate outputs
- Two independent line-locked PLLs to genlock input and output video synchronization

Interlaced and Progressive Scan Refresh

- Programmable blank time-control optimal for HDTV format converter application
- Interlaced @ 60 Hz to 100 Hz

- Progressive scan @ 50 Hz to 75 Hz

14D: Dynamic Picture Enhancements

- Dynamic luminance transience index
- Dynamic chrominance transience index
- Dynamic scan velocity modulation
- Dynamic digital comb filter
- Dynamic motion & edge adaptive de-interlacing
- Dynamic temporal frame-filtering noise reduction
- Dynamic gamma control
- Dynamic black level extender
- Dynamic brightness/contrst adjustment
- Dynamic adaptive smoothing filter
- Dynamic frame/scan rate converter
- Dynamic white peal level restriction
- Dynamic room temperature color correction
- Dynamic digital SVGA overlay

OSD and (optional) VBI/Closed Caption

- Vertical Blank Interval (VBI) is a new industry standard for transmitting non-video data over the TV broadcast signal during the dead time
- (Vertical Blanking). Closed caption is also a non-video data that uses this portion of the transmission time.
- On-Screen Display (OSD). Users can choose to implement text-based OSD through the main CPU or graphical-based OSD through an optional OSD CPU.
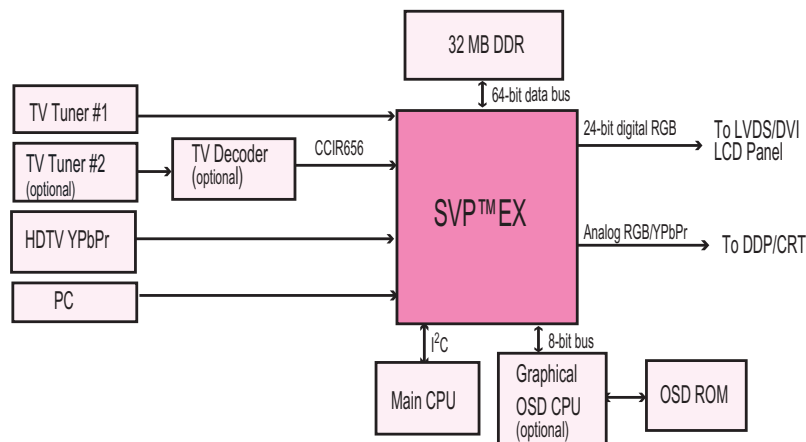
Powerful and Glueless CPU and Memory Interface

- Graphic-based OSD (On-Screen Display) engine with alpha blending display
- Supports high-speed and low-cost frame buffer up to 166 MHz supporting 16-bit, 32-bit, and 64-bit memory bus
- I²C serial communication support
- Analog and digital Fast Blank for Teletext
- 8-bit parallel bus to external CPU
- Simultaneous digital input and digital output

Trident's SVP™EX Configurations

	Digital Input	PWM	SVM	DAC Output	24-bit TTL Output	LVDS Output	Package Type	Application
SVP™EX 12	8-Bit Input	No	Yes	Yes	No	No	208-pin PQFP	Mainstream Digital CRT TV
SVP™EX 22	No	Yes	No	No	Yes	No	208-pin PQFP	Mainstream LCD TV
SVP™EX 32	Yes	Yes	No	No	No	Yes	208-pin PQFP	Mainstream LCD TV
SVP™EX 42	Up to 24-bit	No	Yes	Yes	No	No	256-pin PQFP	Premium Digital CRT TV
SVP™EX 52	Up to 24-bit	Yes	No	No	No	Yes	256-pin PQFP	Premium LCD, Plasma & Rear Projection TV

Trident's SVP™EX Solution