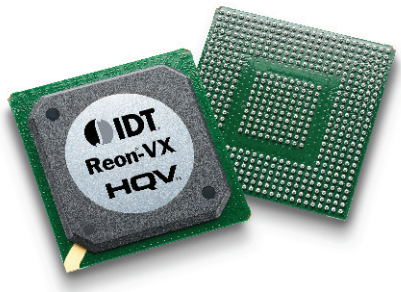
Reon VX Advanced Image Processor

IDT Hollywood Quality Video™ Image Enhancement for Advanced Consumer Products



Description

The IDT® Reon™ VX is a highly integrated SOC that is targeted for high-volume display applications. Reon VX is an advanced image enchancer that delivers the IDT Hollywood Quality Video™ (HQV™) video processing experience to consumers at a cost effective price point. It is also the first in its class to include codec noise reduction and color spectrum controls as standard on-chip features.

Reon VX features true four field motion adaptive de-interlacing—advanced multi-directional diagonal filtering to provide best-in-class de-interlacing of standard definition (SD) and high-definition (HD) signals.

The advanced scaling capability of the eWARP™ VX Engine enables the delivery of superior quality, artifact free video for the highest fidelity consumer experience in home entertainment products, including plasma TV, LCD TV, rear projection TV (RPTV), home theater projectors, AV receivers and DVD players.

Reon VX has a fully independent secondary video path that enables dual video or graphics inputs to be independently processed and positioned anywhere on the display in picture in picture (PIP), picture and picture (PAP) and picture outside picture (POP) formats. It also contains a powerful on screen display (OSD) engine with pixel or area based transparency mapping.

An embedded 179 MHz RISC CPU provides the central control for the chip and manages many I/O interfaces, including a USB on the go (OTG) controller. These features simplify system design and enable competitive mainstream products with no compromise on feature sets.

HQV Image Processing

1080i-to-1080p de-interlacing: Rather than discarding half the resolution of high-definition images, as today's image processors typically do, HQV technology uses the full four field processing window for HD video de-interlacing and cadence detection, thus preserving the rich details in HD imagery.

SD/HD multi-directional diagonal filter (MDDF): A true 10-bit diagonal interpolator that removes any "jaggies" and/or stair-stepping artifacts from de-interlaced video sources, without blurring the image.

Automatic film mode cadence processing: A quantum improvement in the automatic handling of film and video sources such as 3:2 and 2:2 sequences common to broadcast and DVD. HQV cadence processing ensures that users will be viewing film and video sources in the original format without loss of resolution. HQV technology also provides the 3:2 insertion that is needed for Blu-ray disc playback.

Automatic per-pixel video/film detection: Rather than making frame level decisions for video versus film processing, which often causes artifacts in video titles over film backgrounds, HQV makes pixel-level decisions, processing film pixels as film and video pixels as video.

Noise reduction: A fully automatic per-pixel adaptive software algorithm that adds a fourth dimension of pixel-by-pixel noise and motion measurement, detecting and reducing the analog and MPEG noise that currently plagues DVD and broadcast sources.

Color spectrum control: Selective color region enhancement allows certain regions (e.g. skin tones) to be accentuated. Reon VX also contains advanced color edge enhancement that corrects artifacts due to restricted chroma bandwidth and provides full detection and correction for chroma upsampling errors.

Features

HQV image processing

- True 1080i-to-1080p de-interlacing
- Multi-directional diagonal filtering (MDDF)
- Automatic per-pixel film and video detection
- Automatic film 3:2 and 2:2 cadence detection
- Edge anti-aliasing
- SD codec noise reduction
- 3D temporal pixel motion and noise adaptive processing
- Adaptive image contrast enhancement
- Color spectrum control

True 10-bit Processing

Reon VX offers complete input-to-output 4:4:4 color processing and a full 10-bit internal data path, thus enabling the rendering of over 1 billion colors.

Features

True 10-bit processing end-to-end

- 10-bit resolution throughout
- Extended image dynamic range
- Accurate reproduction of over 1 billion colors

Equal Quality Two Channel Processing

The powerful image processing engine of the Reon VX can process two full SD or HD resolution channels thus enabling equal image quality for each video window in PAP mode.

Features

High quality two channel processing

- Dual channel SD/HD de-interlacing
- Advanced PIP and split-screen windowing modes

eWARP™ VX Geometry Processing

For applications requiring image warping, the Reon VX proprietary eWARP VX engine allows for AnyPlace™ flexible projector placement while maintaining the highest quality graphics, fine text and crisp HD video.

Features

eWARP VX geometry processing

- AnyPlace™ extreme 80 degree horizontal and 60 degree vertical off-axis keystone correction
- Continuously variable 2D scaling from ¼ shrink to 8x zoom
- Support for up to 20% lens pincushion and barrel distortion correction
- Edge blending
- Electronic pan, tilt and zoom of real time video

Additional Features

Support for graphics resolutions up to WUXGA

- Graphics input and output up to wide ultra extended graphics array (WUXGA)
- Video inputs and output up to 1080p

High performance embedded RISC CPU

- System control, algorithm flow management and on screen display (OSD) generation
- 2D graphics acceleration and advanced animation
- Integrated web server support for remote access and statistics gathering

System connectivity

- PCI rev 2.2, USB OTG, general purpose I/O (GPIO), UART and two wire serial interfaces
- 32-bit or 64-bit DDR I or DDR II interface at 215 MHz

Package

- 27 x 27 mm, 580-ball PBGA, lead free

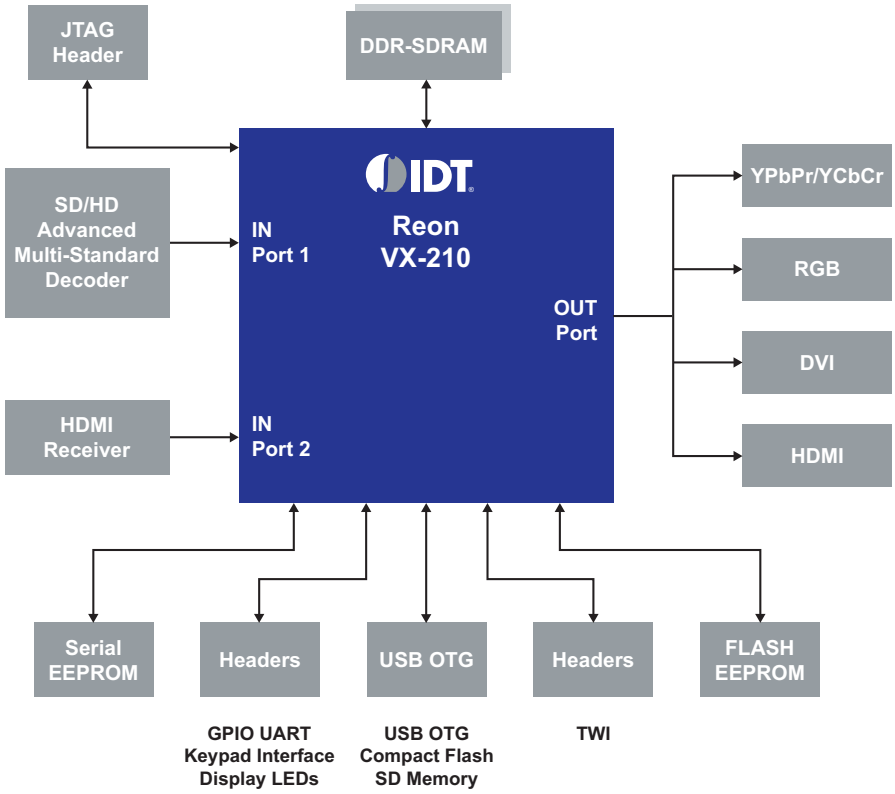


Figure 1. Reon VX System Diagram

Reon VX Products

SKU	Number of Channels	HQV Noise Reduction	eWarp VX Engine	Output Resolution
SXVX-50	1	Yes	No	WUXGA/1080p
SXVX-51	1	Yes	Yes	WUXGA/1080p
SXVX-110	2	No	Yes	SXGA/720p
SXVX-200	2	Yes	No	WUXGA/1080p
SXVX-210	2	Yes	Yes	WUXGA/1080p

Table 1. Reon VX SKU Table

Glossary

DDR	Double data rate; a type of SRAM
De-interlacing	Translating the interlaced video signal from 480i, 576i and 1080i sources into progressive format is required by all digital displays. This is the job of a video processor, and the process itself is called *de-interlacing*.
DVD	Digital video disc
eWARP™	The eWARP-VX Engine is a single pass, two dimensional, non-linear image scaler.
Four field analysis	In order to implement a true per-pixel motion adaptive de-interlacer, the video processor must perform a *four field analysis*. In addition to the two fields being analyzed in the current frame, the two previous fields are required in order to determine which pixels are in motion.
GPIO	General purpose input/output
HD	High definition
HQV™	IDT Hollywood Quality Video™
LCD	Liquid crystal display
MDDF	Multi-directional diagonal filter
OSD	On screen display
OTG	On the go
PBGA	Plastic ball grid array package
PAP	Picture and picture
PIP	Picture in picture
POP	Picture outside picture
RISC	Reduced instruction set computer is a microprocessor designed to perform a smaller number of types of computer instructions.
RPTV	Rear projection television
SOC	System-on-Chip
UART	Universal asynchronous receiver-transmitter; a controller chip
USB OTG	Universal serial bus on the go; an enhancement to USB that enables portable USB devices to be cabled directly together without the need for a PC in between
WUXGA	Wide ultra extended graphics array; A wide screen resolution of 1900 x 1200 pixels

Discover what IDT know-how can do for you.

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