



Geo Semiconductor Inc.

GEO Advanced Geometry Processor IC Geometry Processor for Advanced Capture & Projector Light Engines

Key Features

Advanced Geometry Processing

- Digital Lens™ fully programmable warp filters
- Three high precision geometry correction engines (sxW2-300); Single geometry correction engine (sxW2-100) ; 1/32 pixel calculation accuracy
- Correct for lateral chromatic aberration
- Separate gain and offset controls
- Per pixel color shade correction/ per pixel brightness correction
- Per channel gain and offset controls
- Up to 20% pincushion and barrel distortion correction
- 10-bit per pixel input and output; Up to 16-bit internal processing
- 3-panel color convergence and alignment (sxW2-300)
- Ultra fine image rotation (per channel, for sxW2-300)
- 0.1° resolution
- 3D keystone correction
- Up to +/-70° Horizontal keystone correction
- Up to +/-70° Vertical keystone correction
- Up to +/-10° Tilt correction
- Low latency (150 lines max.)

Inputs and Outputs

- Input and output gamma correction
- Single and double wide progressive video formats
- Maximum input resolution supported: 1920 x 1080p @60 Hz (video) and 1920 x 1200 @ 60 Hz, with reduced blanking (graphics)

- Maximum output resolution supported: 1920 x 1080p @60 Hz (video) and 1920 x 1200 @60 Hz, with reduced blanking (graphics)

High-Performance 32-Bit CPU

- System control, algorithm flow management
- Embedded warp map generation
- User-programmable register interface

System Connectivity

- Flash, 2 x UART, 2 x TWI Master/Slave, TWI Slave, SPI Flash, SPI Slave, GPOs, and JTAG
- 16-bit or 32-bit DDR or DDR2 interface @250 MHz

Package

- 23 x 23 mm, 404-ball PBGA, lead-free

Target Applications

- Projection light engine
- 3-sensor camera engine
- Projection engine/camera engine alignment and calibration
- Projection engine/camera engine brightness/color non-uniformity compensation
- Brightness non-uniformity compensation in direct view LCD TVs

Geo is a highly integrated SOC (system-on-chip), with no industry precedent, targeted for high-volume 3-channel capture and projection light engine applications. Geo is the first video processor to include brightness non-uniformity compensation. This compensation allows separate gain and offset control for chrominance non-uniformity compensation (sxW2-300), as a standard chip feature.

World Headquarters

Geo Semiconductor Inc.

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Development and Operations Center

Geo Semiconductor Inc.

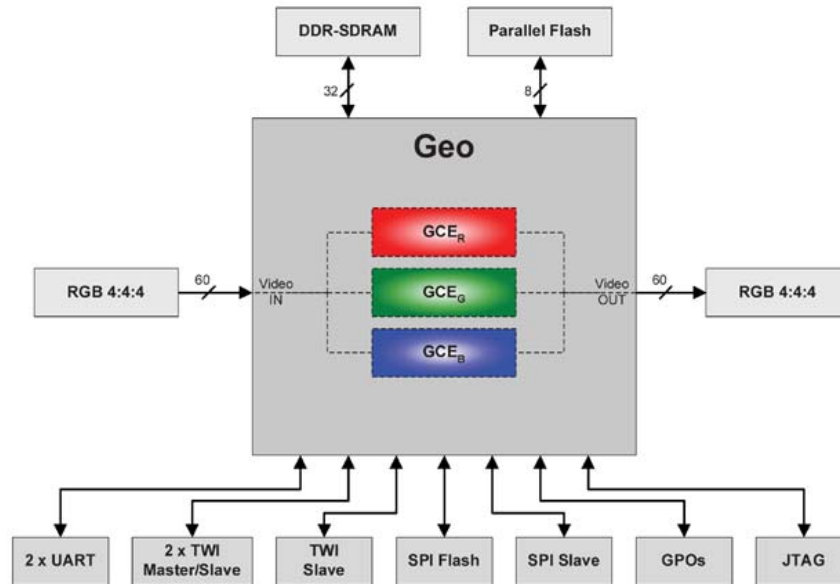
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sxW2-300 SYSTEM DIAGRAM



The chip features independent extended-precision Geometry Correction Engines, one per channel (sxW2-300). The advanced distortion correction and brightness/hue compensation capability of Geo's Geometry Correction Engines, enables the capture and delivery of superior quality, artifact-free video for the highest fidelity consumer experience in RPTV (Rear-Projection Television), home theater front projectors, and 3-sensor HD video cameras.

The chip processes up to 3-color components with different pincushion/barrel correction, keystone correction, and rotational misalignment correction. This enables the correction of optical problems, such as lateral chromatic aberration, 2- or 3-panel convergence correction (prism-to-microdisplay or prism-to-sensor misalignments and channel-to-channel magnification imbalances).

The chip's unprecedented features allow new degrees of freedom for system designers

seeking to inexpensively implement RPTVs with diagonal-to-depth ratios from 4:1 to over 10:1, using techniques such as curved mirrors, advanced lenses, and circular TIR (Total Internal Reflection) Fresnel lenses. Geo sxW2-300 allows lens designs to be modified in order to improve performance (better MTF, lower distortion, reduced temperature effects) while reducing costs (less expensive glass, simpler lens construction, reduction of aspherical elements). For zoom lenses, the chip can dynamically correct for distortion and lateral chromatic aberration as the focal length varies. This provides further cost reduction, by allowing designers to use simpler mechanical elements. The system designers can also take advantage of Geo to greatly simplify alignment and calibration of light engines and their prism/panel assemblies.

An embedded 32-bit RISC CPU provides the central control for the chip and computes the geometry factors required to correct for misalignment in the field.

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