



GEO Semiconductor Inc.

GW3400

Programmable Geometric Processor and ISP

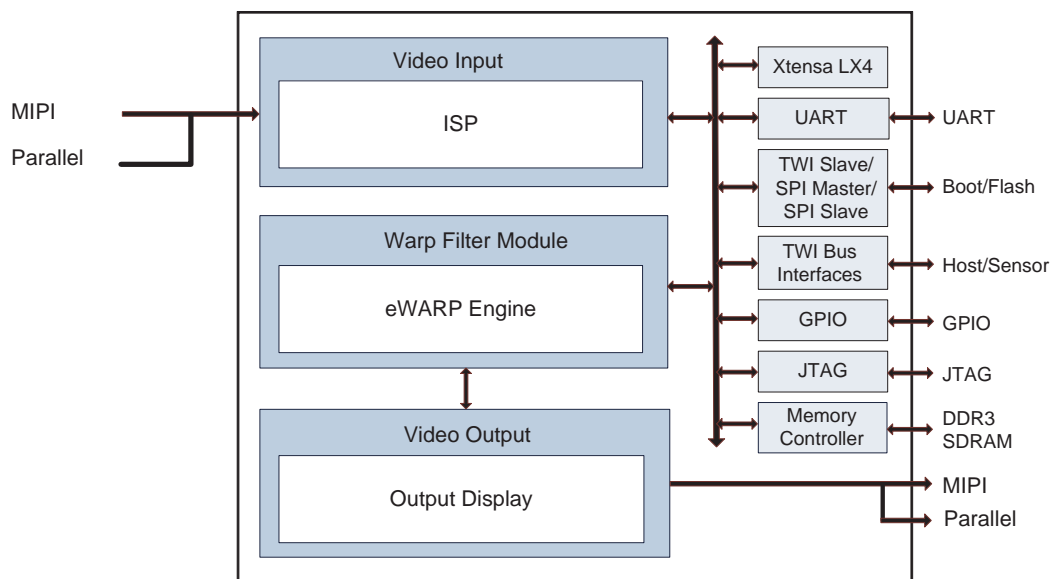
General Description

The GW3400 integrates GEO's patented eWARP® core with an Apical Image Signal Processor (ISP), Tensilica® Xtensa CPU, DDR3 interface, parallel and MIPI interfaces, providing a complete integrated camera system solution.

The GW3400's fully programmable geometric processing engine provides the flexibility and performance to correct complex lens distortion, enable electronic Pan/Tilt/Zoom, and manipulate viewing perspective in real time with as little as 1/6th frame of latency. The eWARP® technology creates multiple detail views in a single pass resulting in a video stream with multiple virtual camera views. The eWARP® core also provides the capability to digitally align and calibrate cameras.

The GW3400 integrates an Apical ISP that provides High Dynamic Range (HDR) processing, spatial noise reduction, temporal noise reduction, and advanced 3A algorithms. The HDR technology applies different processing to each pixel of each video frame to pull out hidden detail in shadows and highlights while preserving color, local contrast, and natural appearance. The ISP supports HDR sensors that provide dynamic range of up to 96dB allowing detail in low light as well as high brightness areas of the scene simultaneously.

GW3400 System Block Diagram





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Features

Advanced Geometric Processing

- GEO's proprietary eWARP® processing engine
- Highly flexible programmable warp maps for distortion correction
- Real-time on-the-fly generation of warp maps
- Very low latency mode (typically 1/6th of a frame)
- Full warp capability

Camera Features

- Distortion correction of 180 and 360 degree wide field of view (FOV) lens
- Zero content loss for 190 degree FOV video
- Scene perspective orientation
- Multiple view creation in a single pass
- Display of split views, zoom, panorama
- Electronic Pan/Tilt/Zoom (ePTZ)

Video/Projector Features

- Keystone correction, zoom/shrink scaling
- Pincushion/barrel distortion correction
- Multi-video stitching with edge blending, precise convergence, brightness and non-uniformity correction support

Image Sensor Processor

- Apical ISP
- Sensor support up to 4096 x 4096 pixels
- HDR processing utilizing Local Tone Mapping
- Advanced spatial and temporal noise reduction
- Zone-based statistics for Auto White Balance, Auto Exposure, and Auto Focus
- Non-linear two dimensional sharpening
- Dynamic defect correction
- Lens shading correction

Applications

- Automotive rear view, front view, blind spot, and surround view cameras
- IP surveillance cameras
- Video conferencing and telepresence

Inputs/Outputs, Video Formats

- Input Interfaces: 4-lane MIPI, Parallel
- Output Interfaces: 1-lane MIPI, Parallel
- Input Formats:
 - 8/10-bit YUV 4:2:2 over 8/10 or 16/20-bit interface
 - 8/10/12-bit Bayer RGB
 - 16/24/30-bit RGB
 - 24/30-bit YUV 4:4:4
- Output Formats:
 - 8/10-bit YUV 4:2:2 over 8/10 or 16/20-bit interface
 - 8/10-bit Bayer RGB
 - 24/30-bit RGB
- Pixel rates up to 200 MHz
 - 2560 x 1600 at 30 Hz
 - 1920 x 1080 at 60 Hz
 - 1280 x 720 at 120 Hz
 - 4k x 4k at 7.5 Hz

Memory Interface

- DDR3 SDRAM memory up to 600 MHz

System Connectivity

- TWI Slave/ SPI Master/ SPI Slave, TWI Bus Interfaces
- UART, JTAG, GPIO

Power and Voltage

- Power Supplies: 1.8 V ±5%, 1.5 V ±5%, 1.1 V ±5%,
- DDR3 SDRAM voltage: 1.5V ±5%
- Typical power consumption:
 - 748 mW for 1080p60, ISP, DDR
 - 276 mW for 720p60, ISP, no DDR

Ordering Information

Part Number	Package: Type, Pins	RoHS/ Lead-Free
GW3400	361-pin TFBGA, 12 mm x 12 mm x 1.1 mm, 0.5 mm pitch	RoHS/ Lead-Free

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