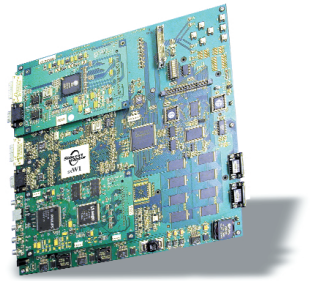
PRODUCT BRIEF

GEOMETRY MANIPULATOR REFERENCE DESIGN USING THE sxW1

GEM



The Silicon Optix cost effective GEM (GEometry Manipulator) is a highly integrated, expandable modular reference design that uses the Silicon Optix sxW1. GEM can be used to simplify the design and development process of business projection, off-axis, wide-angle surveillance, video conferencing systems and allows OEMs to test and demonstrate products much earlier in the design cycle.

The GEM can be incorporated into advanced image processing systems, to correct for geometry and lens distortions or can perform image processing for real-time, non-linear image manipulation. GEM incorporates full feature video and graphics processing functions such as: de-interlacing (high quality motion adaptive de-interlacer with 3:2 and 2:2 pull-down for film-to-video sources), high quality advanced scaling (shrink and zoom), picture-in-picture, aspect ratio conversion, and frame rate conversion.

GEM can correct for pincushion/barrel lens distortion, horizontal and vertical keystone and aspect ratio distortions using advanced digital image processing techniques. This electronic correction capability decreases the cost and weight of sophisticated projection systems by reducing the need for expensive and heavy optics.

Unlike optical correction, the GEM provides a flexible digital electronic solution, eWARP™, that can correct severe geometry and optical distortions. The distortion correction is parameterized by an array of coefficients that is user programmable. The coefficient array can be updated on a frame-by-frame basis to compensate for dynamic distortions. This capability can be applied to real-time systems for medical imaging, navigation display systems, virtual reality head-mounted displays, image processing systems, machine vision systems and special effects video generators such as, those processed by a DVE system (Digital Video Editing).

GEM supports a full range of industry standard graphics and video input and XGA output formats for system compatibility. For the input, interconnect is offered through a modular design concept. Video and graphics modules can be designed to suit individual system requirements. A video and graphics module is supplied for evaluation and design integration.

Frame rate conversion, internal to the sxW1, is also incorporated to support a broad range of input formats as well as synchronization Picture in picture (PIP) overlays that can be captured from the secondary input channel. GEM provides a full complement of input and output connections. Active inputs are automatically detected and standard timing format recognized and configured.

FEATURES

High precision floating-point geometry processing.
Incorporates dual VLIW processors providing 1.5GFLOP of computation power

User adjustments for pincusion and barrel lens distortion, horizontal and vertical keystone, image scaling, rotation, and arc-raster

Input and output gamma correction

User loadable and selectable distortion maps

Programmable filter coefficients for image sharpening/softening

Advanced filtering engine providing high quality dynamic scaling (range of 32x zoom and shrink)
Patented asymmetrical filter processing

Motion adaptive, spatial and static-mesh de-interlacing

RGBHV and DVI graphics input/output

NTSC/PAL: composite, S-Video and YCbCr component video inputs

Automatic input format detection

Picture-in-picture capability

On-Screen Display support

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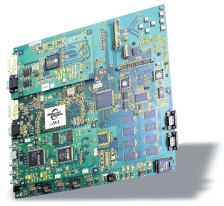


GRAPHICS INPUT

(Digital – DVI & Analog - RGBHV)

- VGA, 640 x 480 @ 60/72/75/85Hz
- SVGA, 800 x 600 @ 56/60/72/75/85Hz
- XGA, 1024 x 768 @ 60/70/75/85Hz
- SXGA, 1280 x 1024 @ 60 Hz
- DOS Mode, 720 x 400 @ 70 Hz

VIDEO INPUT

- Connector:
  - YCbCr component
  - S-Video
  - Composite
- Format:
  - NTSC
  - PAL

OUTPUT FORMAT

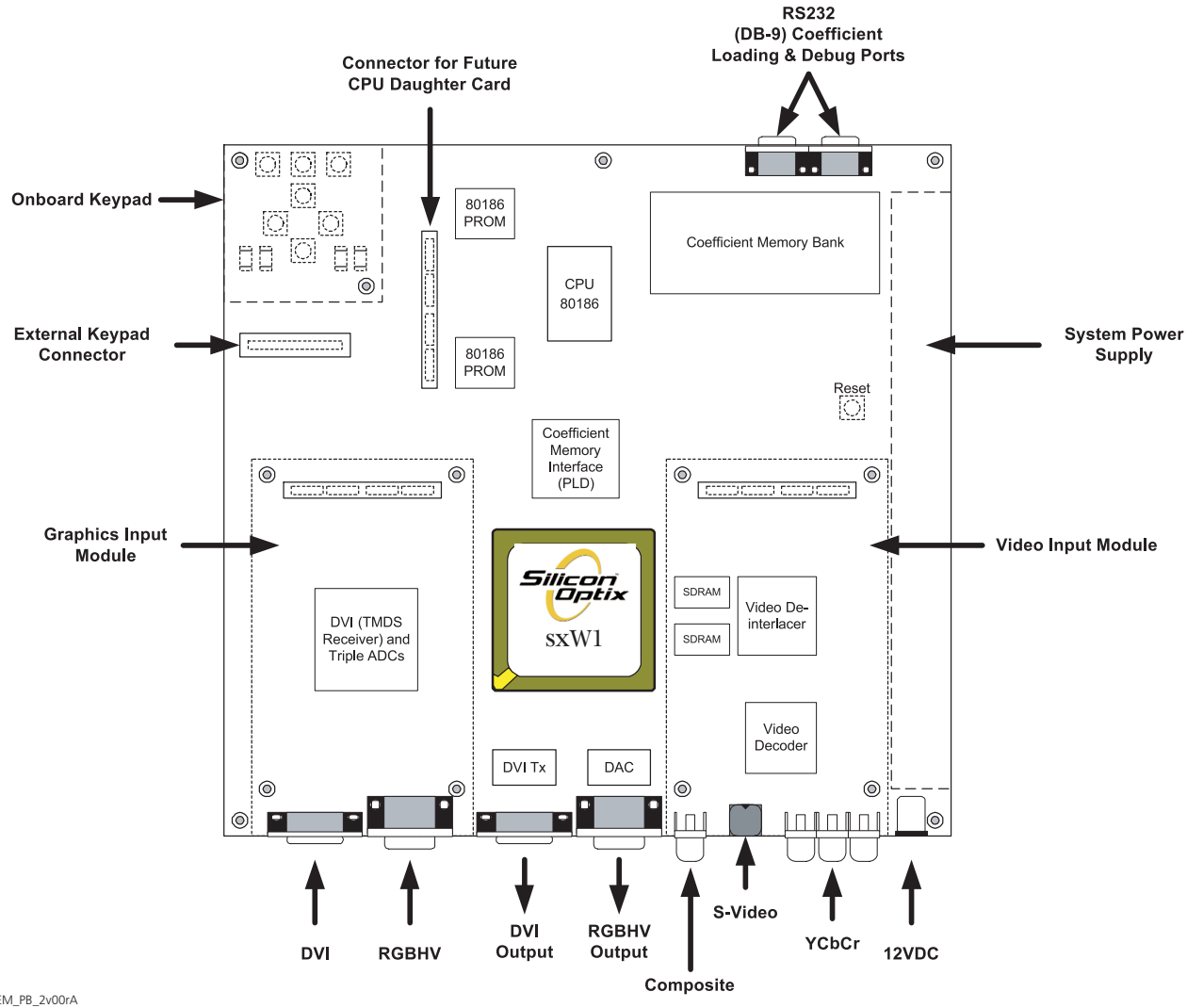
(Digital - DVI & Analog - RGBHV):

- XGA, 1024 x 768 @ 60 Hz

IMAGE ADJUSTMENT

- Horizontal/vertical flip
- Arbitrary scaling (zoom and shrink)
- Horizontal and vertical keystone
- Dynamic (frame-by-frame)
- Pincushion/barrel
- 90° rotation & scale
- User defined distortion maps

GEM BOARD LAYOUT DIAGRAM



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