

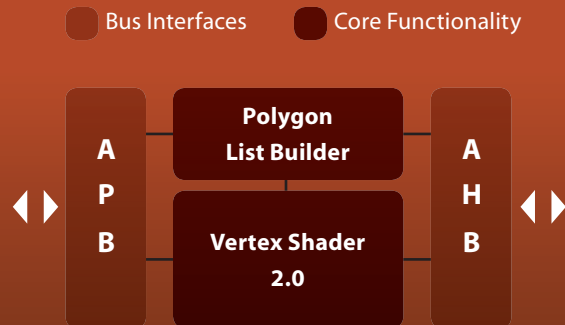
## FALANX MALI GEOMETRY PROCESSOR (GP)

The Mali Geometry Processor (GP) is a high performance, low gate count vertex geometry and general media processor hardware IP core that is used in conjunction with the Falanx Mali line of 2D/3D pixel processing and video encoding/decoding cores. These cores together provide the most powerful multimedia acceleration available for SoC manufacturers designing next generation multimedia-enabled mobile devices, portable entertainment systems, set top boxes and in-car navigation systems.

MaliGP supports all functionality specified in the OpenGL® ES v1.1 and Microsoft Direct3Dm application program interfaces (APIs) and is fully aligned with the industry shift to OpenGL ES 2.0. MaliGP is available in both VHDL and Verilog formats.

### Architecture

- AHB 2.0 / AXI / OCP
- 32 / 64-bit interfaces
- Automated clock gating control
- Single bus master interface
- Autonomous operation
- Leading Memory bandwidth usage
- Fixed memory usage



With only standard interfaces, MaliGP does not require any modifications to the system-on-chip environment. MaliGP is designed to deliver high performance in high memory latency systems.

The MaliGP is more than a vertex shader for 3D graphics. It can be viewed as a specialized DSP processor capable of accelerating a multitude of media algorithms, including imaging (JPEG2000), audio and video compression and decompression. It also embeds technology for improving bandwidth and memory utilization normally plagued with deferred rendering architectures. The MaliGP is the perfect companion for the Mali55 in accelerating video and reducing power consumption for 3D graphics and for the Mali110 in delivering an efficient high performance mobile gaming and video experience.



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## Performance

	Triangles/s	Video Encode Performance	Video Decode Performance
MaliGP@150MHz	5M	MPEG-4 VGA Encode@30fps	MPEG-4 VGA Decode@30fps

Triangle Rate is measured for transform operations only. Performance with lighting operations is very dependent on light models and numbers of light sources. In a scene with 3 directional light sources the performance drop will be about 50%.

## Graphics Capabilities

The MaliGP can be viewed as a high performance floating point DSP, a programmable vertex shader or a fixed function vertex pipeline. It can be used for several purposes in addition to those listed in the table below.

Graphics Features	Video Capabilities
Transform and lighting (OpenGL ES v1.1)	Discrete Cosine Transform (DCT)
Vertex Shader 2.0+	Inverse Discrete Cosine Transform (iDCT)
Flexible Input and Output formats	Zig Zag
Primitive Clipping	Quantization
Primitive Construction (points, lines, triangles, quads, backface culling)	Inverse Quantization
	Color Space Conversion
Adaptive Tile List Generation	Deblocking

## Physical Characteristics

	Logic Gates	SRAM	Power	Max Clock	Die Area
MaliGP	150k	12kB	0.3 mW/MHz	150 MHz	1.5 mm <sup>2</sup>

All numbers are reported in Free Artisan .13 NAND2X2 and 80MHz implementation and full scan on all flip flops.

Only Falanx has the robust technology to make multimedia design this fast, efficient and effective. For more information about Falanx visit [www.falanx.com](http://www.falanx.com).

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