PowerVR MBX Pro

The MBX Pro graphics processor is an IP core specifically developed to meet the growing multimedia needs of very high performance system-on-chip (SoC) applications for consumer electronics such as Internet appliances, tablet PCs, SDTV and HDTV set-top boxes, games consoles and home/in-car infotainment systems. When used with embedded microprocessor cores, MBX Pro enables the migration of complex 3D/2D graphics and video content to such platforms.

MBX Pro has all the inherent benefits of the PowerVR architecture, including low memory bandwidth, exceptional performance, market leading image quality and low power demands. Other features include:

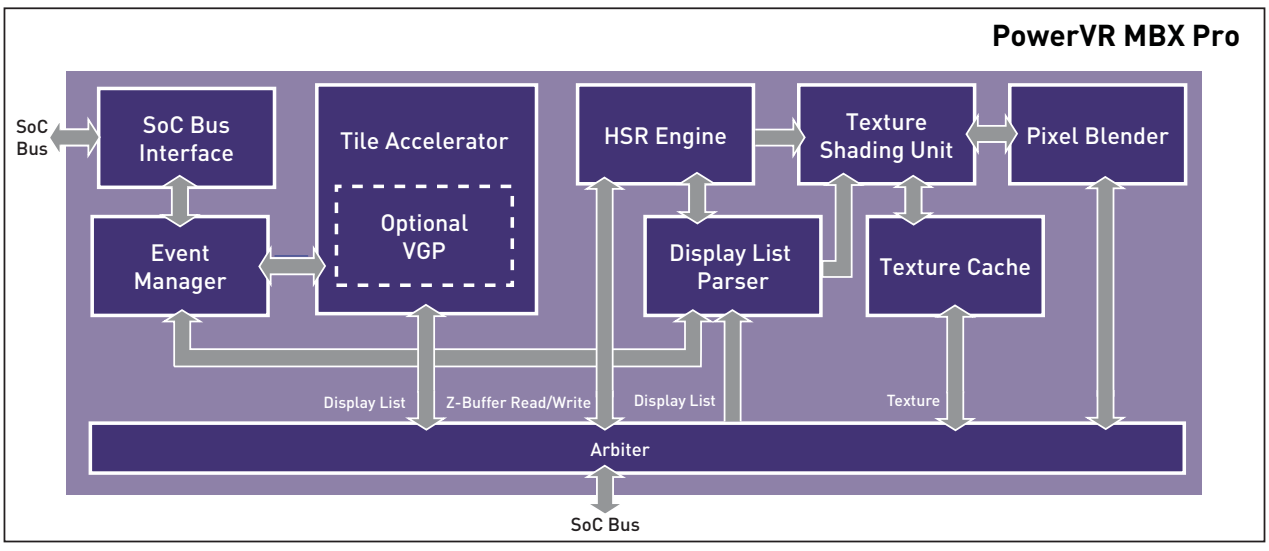
- Small die size
- Easy SoC integration using standard synchronous bus interfaces, e.g., AMBA AHB
- Synthesizable soft IP package
- Optional companion Vertex Geometry Processor for enhanced transformation and lighting performance
- 2Dvia3D™ - 2D operations, including ROPs, scaled BLTs and colour space conversion, integrated into 3D pipeline, removing requirement for separate engine.
- Performance optimized for Unified Memory Architectures (UMA).
- Process portable design: 0.18µm, 0.13µm, 90nm and beyond
- Full scan design
- Synthesizable up to 80 MHz clock speed in 0.18µm and 120 MHz in 0.13µm.
- Patent protected algorithms

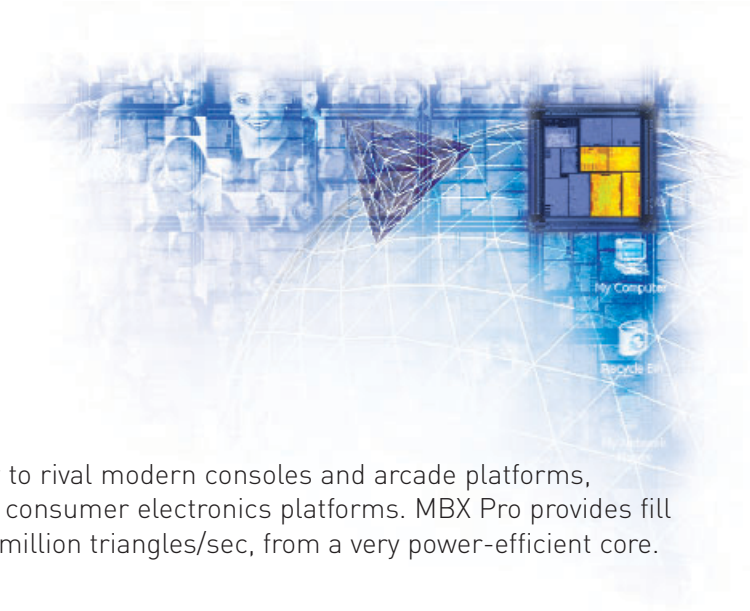
3D Features

- Tile-based rendering - enables on-chip processing of costly hidden-surface removal and pixel blending, and enables deferred texturing, eliminating all unnecessary accesses to off-chip memory.
- Scene Manager™ - seamless scene complexity management to support arbitrarily complex scenes in limited memory footprints.
- ITC™ - PowerVR Internal True Colour. Colour operations are performed on-chip at 32-bpp for superior colour precision.
- FSAA4Free™ - full screen anti-aliasing with no performance loss delivering smoother more realistic graphics at mobile display resolutions.
- PVR-TC™ - PowerVR texture compression for small memory footprints.

All key 3D features are enabled, including: flat and Gouraud shading; perspective texturing; specular highlights; 2 layer multitexturing; 32-bit Z support; full tile blend buffer; effective fill rates that increase with 3D scene complexity; per vertex fog; 16-bit textures; 32-bit textures; YUV video textures; point, bilinear, trilinear and anisotropic filtering; full range of blend modes; alpha test; full-scene anti-aliasing.

PowerVR MBX Pro is fully compatible with all industry-standard graphics APIs. Reference implementations are available for the following: Direct3D on Windows CE; OpenGL ES on SymbianOS; and MGL (PowerVR's native API) on SymbianOS and Linux.





Performance

With graphics performance, feature set and display quality to rival modern consoles and arcade platforms, MBX Pro enables the migration of leading-edge content to consumer electronics platforms. MBX Pro provides fill rates exceeding 750 million pixels/sec and throughput of 3 million triangles/sec, from a very power-efficient core.

Size and Power

PowerVR MBX Pro's unique patent-protected technologies enable it to deliver class-leading performance from a very small core, and its sophisticated power management techniques exploit both module and register-level clock gating to ensure the lowest possible active and standby power dissipation.

Related System Solution IP

- PowerVR Vertex Geometry Processor (VGP Pro) is a high-performance, fully programmable floating-point SIMD coprocessor carefully matched to the requirements of MBX Pro. Designed for optimal 3D Transformation and Lighting (T&L), VGP Pro offloads these highly computer intensive tasks from the host CPU. With an instruction set carefully designed to allow common T&L operations to be performed in a minimal number of instructions, VGP Pro is capable of four floating-point operations per clock.
- PowerVR M2VX is a famaily of MPEG-2 video decoders for MP@ML, MP@HL or multiple stream decode.
- PowerVR M24VA is an efficient multi-standard video decode accelerator, designed to accelerate the decode of MPEG-2, MPEG-4, WMV8 and WMV9 video streams. It offloads iZZ, iDCT and motion compensation decode steps from the CPU for lower clock rate and power solutions.
- PowerVR Pixel Display Pipeline (PDP) is a multi-layer display controller, designed to support modern layered user interfaces. Configurable for up to 6 planes with support for YUV and RGB, scaling is available on two planes, and the PDP has configurable alpha-blending and chroma key support.
- PowerVR TVE is a digital TV encoder, designed to output PAL or NTSC encoded video with simultaneous S-Video, RGBS or YUV component video for TV display.

MBX Pro Core Design Package

MBX Pro is available as soft IP and ships with:

- Synthesis scripts
- Extensive verification test suite to ensure correct implementation of the design in an SoC
- Behavioural simulator written in ANSI C
- Hardware implementation guides
- Programmer's reference manuals
- Reference drivers for multiple APIs on multiple platforms

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