POWERVR

PowerVR Overview

PowerVR, a division of Imagination Technologies, develops and licenses graphics, video and display technologies that seamlessly integrate to enable the design of state-of-the-art system-on-chip (SoC) solutions.

PowerVR cores are available off-the-shelf for many different platforms within the entertainment and consumer electronics markets, including:

- Handheld devices
- Amusement and gaming
- In-car information systems
- Set-top boxes

Nearly twenty years of research, development and refinement of pioneering video and graphics technologies has resulted in a product line which brings to market mature and proven technologies, including a unique method of real-time 3D rendering, highly integrated 2D, innovative and flexible video processing and advanced display technologies.

PowerVR IP cores include:

- Scalable 3D/2D cores
- MPEG-2 and multi-standard video cores
- Display cores for flexible display support
- TV encoders
- SoC support modules, including bus interfaces, DMA support and I/O

All PowerVR cores are designed for scalability, efficiency and reusability. The cores are designed to be complementary within an SoC framework and support a range of configurable functionality to allow designers to achieve the optimum SoC solution.

POWERVR CORES AVAILABLE FOR LICENSING

Graphics	Description
MBX Pro MBX MBX Lite	Off-the-shelf 3D, 2D and video acceleration cores: MBX Pro for very-high-performance applications such as IA devices and HDTV resolution media gateways or set-top boxes; MBX for incredible performance handheld devices and mid-range IA solutions; and MBX Lite for power-critical, cost-sensitive mobile applications.
PMX	PC and arcade graphics acceleration.
2D CIS	2D core with car-information specific features.
Video	**Description**
M2VX M2VX-H M2VX-HM	MPEG-2 video decode family: M2VX full MPEG-2 MP@ML video decode solution; M2VX-H for HDTV solutions; and M2VX-HM for demanding multi-stream and HDTV applications.
M24VA	Multi-standard video decode accelerator for MPEG-2, MPEG-4, WMV8 and WMV9 video streams. Offloads iZZ, iDCT and motion compensation decode from CPU.
MVDA2	2nd generation video decode with H.264 support.
Display	**Description**
PDP	Fully flexible pixel display pipeline for set-top box, car information system or handheld applications.
I2P-MA	Delivers advanced motion adaptive de-interlacing support and film mode detection.
I2P-MC	Broadcast quality motion compensation core for interlace to progressive conversion.
TVE	Fully digital PAL and NTSC encoder with HDTV support.

PowerVR Graphics Cores

PowerVR's graphics cores include 2D, 3D and geometry accelerators, targeting a range of markets from in-car information and entertainment systems to set-top boxes.

PowerVR's 3D cores use tile-based rendering and deliver full hardware acceleration of 32-bit pixel blending, hidden-surface elimination, multitexturing, anisotropic filtering and texture decompression. The optional Vertex Geometry Processor (VGP) provides programmable vertex shading.

The innate scalability of the PowerVR 3D architecture makes it suitable for a wide spectrum of solutions, from the most performance-hungry arcade systems to the most power-sensitive handheld devices including 3D-enabled phones.

PowerVR Video Cores

PowerVR's scalable video cores support a number of compressed video formats and a broad range of decode acceleration performance from H.264, MPEG-4, WMV and full-resolution SD MPEG-2 through to multi-stream decode of HDTV broadcasts, making them suitable for handheld, in-car and digital TV/set-top box applications.

PowerVR Display Cores

PowerVR's display cores operate seamlessly with the 2D, 3D and video cores, providing high-quality scaling, overlay and blending, interlace-to-progressive (I2P) video conversion and interlace output with flicker filtering.

3D Technology Overview

PowerVR's unique tile-based rendering architecture allows a very small die to deliver higher performance and higher image quality at lower power consumption than all competing technologies, and is currently the leading high-performance 3D architecture for handheld devices.

An on-chip tile buffer keeps all bandwidth-intensive Z-buffering and pixel processing on-chip, allowing 32-bit precision rendering and compositing on systems with 16 or 12-bit frame buffers, and enabling deferred texturing which eliminates all redundant texturing operations.

As a result PowerVR's 3D cores are small, power-efficient, deliver very high performance and image quality with modest bandwidth requirements and enable affordable, high performance, low power solutions with high suitability for low-cost single-chip integrated products and embedded systems.

Proven technology

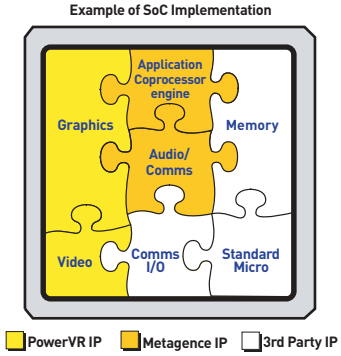
To date tens of millions of PowerVR-based chips have been shipped worldwide into consoles (Sega Dreamcast), PC cards (including Hercules, Matrox and VideoLogic) and arcade systems, where the Naomi and Naomi II have become the industry-standard arcade 3D platform. Utilised by five of the world's top 10 semiconductor manufacturers, as well as leading consumer and entertainment brands, PowerVR MBX is the de facto standard for advanced mobile graphics.

Each new implementation of PowerVR's 3D technology maintains the same key features and high performance, allowing the migration of content from established platforms.

SoC solutions

A range of SoC solutions combining PowerVR cores with a number of processor cores are being developed with our partners for applications in amusement, car navigation, in-car entertainment, handheld and mobile markets. PowerVR technology has been licensed to companies such as Intel, Philips, Renesas, Samsung, Sega, Sharp and Texas Instruments. ARM Ltd offer the MBX family of cores as their hardware graphics solution and many of the other PowerVR cores are designed into DVB, STB, in-car and handheld applications including the most highly integrated SoC for digital TV solutions available today.

Example of SoC Implementation



PowerVR technology provides key graphics and video components, which can be combined with compatible IP cores from third parties or from Imagination Technologies' other technology divisions, which provide highly complementary IP in the form of the Metagence META™ multi-threaded DSP and the Ensigma Universal Communications Coprocessor (UCC). Together PowerVR, Metagence and Ensigma offer a comprehensive set of efficient and compatible cores that enable rapid development and integration of SoC solutions.

PowerVR cores are available as synthesizable IP with a complete set of documentation, synthesis scripts, test benches and regression tests as well as wide ranging SoC bus interface support to allow silicon designers to integrate them in the shortest possible time. Each core is also supported by reference driver software to accelerate time to market.

PowerVR
Imagination Technologies plc
Innovation Centre, Home Park Estate, Kings Langley,
Herts, WD4 8LZ
licensing@powervr.com **www.powervr.com**

POWERVR
Imagination TECHNOLOGIES
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