Imagination

IMG B-Series

IMGIC TECHNOLOGY

IMG B-Series features IMGIC framebuffer compression technology – the ultimate low-bandwidth GPU IP solution

Building on our previous generation framebuffer compression technology, IMG B-Series GPUs featuring IMGIC offer:

- Lossless compression for perfect image quality at the lowest bandwidth
- Lossy compression to maintain the best user experience in constrained bandwidth conditions
- Up to four compression/quality levels – Lossless, 75%, 50%, 25%
- Algorithms optimised for best quality versus bandwidth or quality versus silicon area
- Unified stand-alone IMGIC (de-)compression blocks enabling easier integration with third-party IP

What is IMGIC Technology?

Imagination Image Compression (IMGIC) is the latest version of our framebuffer compression technology. Framebuffer compression aims to reduce the bandwidth and power consumption generated by reading and writing render targets to and from system memory.

IMGIC includes a lossless compression mode; a variable compression rate mode where quality remains perfect, but the compression achieved depends on the contents of the render target. Typically, a reduction of 50% is obtained across a wide range of reference test images.

IMGIC also includes a visually lossless compression mode that guarantees a minimum compression rate, thus ensuring that memory footprint, bandwidth and power consumption are all reduced. IMGIC includes three compression rate levels versus uncompressed:

- 75% - Effectively perfect image quality
- 50% - Visually lossless quality
- 25% - Extreme bandwidth saving

Trading quality versus bandwidth resulting in a better user experience is a common approach widely used in video streaming and conferencing systems and ensures performance can be maintained.

IMGIC wraps multiple algorithms into a single standard for easy integration in third-party IP, ensuring we offer the best balance of silicon area cost versus feature-set and compression/decompression complexity for a range of different market segments. For our automotive XS-family cores it also includes end-to-end CRC-based data integrity protection for the render target data flow. IMGIC is compatible with a wide range of our GPU IP including the 9 Series, A-Series and our latest B-Series. IMGIC complements a range of other data compression algorithms also included in Imagination's GPUs, such as geometry compression (PVRGC) and texture compression (PVRTC).

How would I use IMGIC Technology?

Smartphone/tablet

Premium smartphones now target display sizes up to 4K and refresh rates up to 120Hz, which consume near 8GB/s (read + write) which is a significant portion of the available system-level bandwidth – with a matching power cost. With IMGIC's lossless mode this can be significantly reduced to an average of only 4GB/s without impacting quality. With lossy compression we can guarantee a cost of 6GB/s (75% - near perfect quality), 4GB/s (50% - visually lossless quality) or even 2GB/s (25% - best user experience, lowest bandwidth).

Automotive

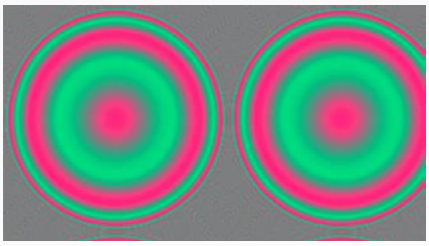
In-car infotainment systems include ever more high-resolution displays enabling digital dashboard and entertainment systems. With IMGIC this bandwidth can be kept under control and with CRC protection, data integrity can be guaranteed when handling functionally-safe data, such as for surround-view systems.

DTV and STB

The consumer market is highly cost-sensitive and bandwidth can contribute significantly to device costs. With 4K becoming mainstream the bandwidth required by the GPU and display subsystem is significant and IMGIC helps to bring this under control in a dynamic way where user experience and quality can be balanced with available bandwidth budgets under different usage scenarios. This dynamic approach means that smooth operation can be guaranteed with minimal impact on visual quality by guaranteeing enough bandwidth remains available in the system for critical operations.

Server

Servers are energy-consumption sensitive, and with many users in a cloud-gaming system, managing bandwidth budget is critical to maintain user experience and performance within the thermal budgets of the server racks. IMGIC enables render target bandwidth to be managed by trading quality versus bandwidth to ensure the best overall system experience for all users.



	IMGIC 50% Quality Optimised		IMGIC 50% Silicon Area Optimised		IMGIC BW % of Max	
	PSNR	SSIM	PSNR	SSIM	Lossless Mode %	50 Mode %
Parrot	55.25	0.9998	50.12	0.9995	45.38	42.30
Manhattan	58.22	0.9999	49.65	0.9993	43.46	39.42
Artificial Test	Perfect	Perfect	Perfect	Perfect	31.64	31.64