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Introducing

FXT1™: Advanced Texture Compression



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FXT1™: Texture Compression

What is it?

- Next-generation advanced texture compression technology
- Open source
- Encoding and decoding tools and source code for compression of textures for 3D objects
- Free



FXT1™: Texture Compression

Solving the problems of limited storage and bandwidth available for texturing

- **Storage:** Reduces the amount of memory required to store a given texture up to 8:1
 - Higher resolution textures can now be utilized
- **Bandwidth:** Reduces the amount of memory bandwidth required for texturing
 - Dramatic fill-rate performance can be realized



FXT1™: Texture Compression Benefits

- No perceptible loss in image quality
- Enables use of very high-resolution textures
- Decreases memory storage requirements
- Decreases memory bandwidth requirements
- Maximizes available memory bandwidth
- Increases sustained fill-rate and frame rates



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FXT1™: Texture Compression Benefits

- Increases total number of textures available for rendering
 - Store up to 8x number of compressed textures in same space that used to be required for just one
- Enables use of higher resolution textures for better image quality
 - Uncompressed 2048x2048 32bpt texture requires 16MB memory (almost unusable on current hardware) compared 2MB when FXT1 compressed



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FXT1™: Texture Compression Benefits

- Permits use of more textures per polygon for advanced effects
 - FXT1 texture compression makes more bandwidth available
 - More textures can be used to render a given object allowing for effects like bump mapping, light maps, detail textures, etc.



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FXT1™: Texture Compression Benefits

- Lowers bandwidth requirements for better fill rate performance
 - Increases number of texels fed to raster engine
 - Increases fill rate
 - Increases frame rates

FXT1™: Texture Compression

How does it work?

Encoding:

- Divides image up into multiple 4x4 or 4x8 texel blocks
- Individual texel blocks encoded using one of four different algorithms to maximize image quality
- Results in 4 bit-per-texel storage and bandwidth requirements
- Compressed textures can be encoded during installation, when a scene loads, or stored on CD

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How does it work?

Decoding:

- Compressed textures are stored natively in system memory or local frame buffer memory
- Decompression is performed by 3D hardware accelerator during run-time only when the compressed texture is used for rendering
- Each texel block includes a 2-bit field used to identify which of the four different compression algorithms is used



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FXT1™: Texture Compression

How does it look?

Uncompressed Image

24 bits-per-textel



FXT1 Compressed Image

4 bits-per-textel





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How small can the textures get?

Texture Size	Memory Requirement at 32-bit	Memory Requirement with FXT1 at 4-bit	Compression Ratio
2048x2048	16 MB	2 MB	8:1
1024x1024	4 MB	.5 MB	8:1
512x512	1 MB	.25 MB	8:1
256x256	.25 MB	.03 MB	8:1



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FXT1™: Texture Compression

What FXT1 delivers that other texture compression doesn't

- Open Source format
- Cross Platform Support
 - Windows, Macintosh, Linux and BeOS
- Includes free tools for encoding and decoding
 - No royalty or licensing fees for content developers or independent hardware vendors
 - Allows anyone to innovate with higher quality and/or faster implementations



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FXT1™: Texture Compression

What FXT1 delivers that other texture compression doesn't

- Highest possible image quality
 - Multiple algorithms used for every image to deliver most precise reproduction of original artwork
- Best compression ratio for textures with more than single bit alpha
 - FXT1 uses 4 bpt compression for textures even with multi-bit Alpha channels -- reduces storage requirements by 1/3
- Free

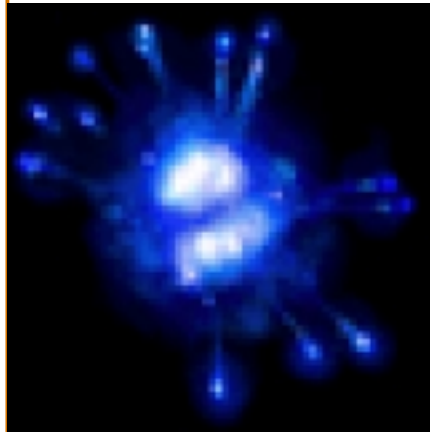


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FXT1™: Texture Compression

How does it compare to S3TC™?



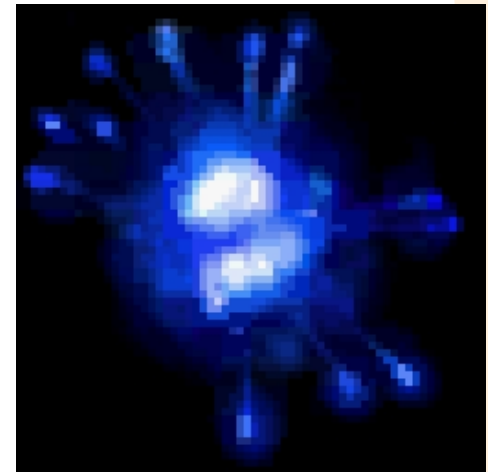
Original
Image

Single algorithm



S3TC

Up to four different
algorithms



FXT1

FXT1 retains more detail than S3TC by using four different encoding algorithms for each image. This contrasts with only one algorithm used by S3TC.

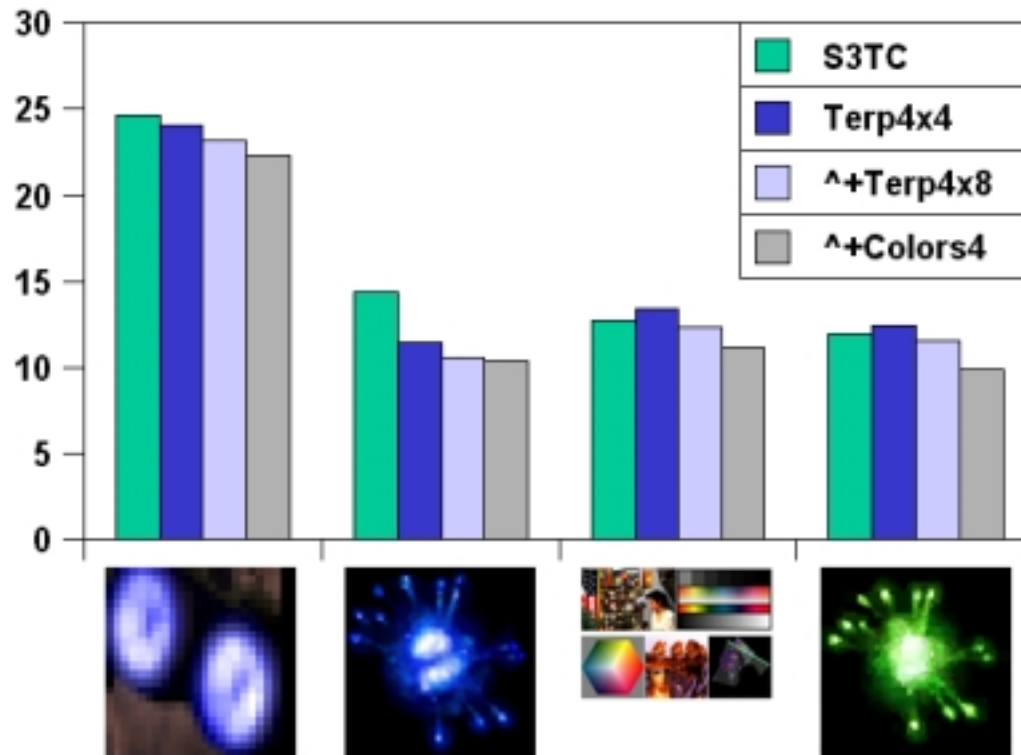


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FXT1™: Texture Compression

How does it compare to S3TC™?



With 4 different techniques used to compress each image, FXT1™ provides the most accurate image reproduction as measured by Root Mean Square error of each encoding algorithm



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Conclusion



FXT1™: Texture Compression Conclusion

- Free
- Open Source tools and source code
- No license or royalty fees for Developers and IHV's
- Allows developer to innovate with higher quality and/or faster compression for titles
- Delivers highest possible image quality for compressed textures



FXT1™: Texture Compression Conclusion

- Maximizes fill rate by making texture data transfer more efficient
- Enables use of more textures at higher resolutions to create the most visually stunning 3D content
- Allows for more textures per object and per title for advanced effects
- Supports cross platform - all operating systems and API's