Nintendo 64 graphics hardwired

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The Cutting Edge Special Report

Nintendo 64 Graphics—Hardwired

By The Whizz
(Special thanks to Nintendo of America)

If you're trying to understand next-gen graphics, then you're being bombarded by a ton of mind-boggling terminology. Here are definitions to some of the key graphics features hardwired into the Nintendo 64 Reality Co-Processor graphics engine.

Anti-aliasing eliminates the jagged edges of polygons that compose Mario's face.

MIP mapping keeps Mario looking sharp as he moves toward you.

One of the cool things that makes the Nintendo 64 a lean, mean graphics-generating machine is that many complex graphics features are built into it. This means that game developers can juice the speed of the gameplay and still get those eyeball-popping visuals, since they don't have to plug in extra code to access cool effects. Here are some of the features that enhance the graphics capabilities of the N64.

Basic Graphics Lingo

Bitmap—An image represented by pixels, sometimes called "texture"

Pixel—Short for "picture element," this is a single dot on a computer monitor or a TV screen. Onscreen images are comprised of pixels.

Polygon—The basic 2D element from which 3D objects are constructed. Typically, triangles are used, and sometimes rectangles.

Rendering—The process of creating an image on a screen from visual elements such as polygons, textures, or lights, as opposed to displaying pre-computed graphics and animation. Real-time rendering is what enables a player to move freely in a 3D world such as the one depicted in Super Mario 64.

Texel—A pixel within a texture map.

Texture mapping—The process of placing a bitmap image (a texture) onto a surface during rendering. For example, to create a brick wall, a photograph of bricks is placed onto a polygon. Texture mapping is the basic tool used to create realistic 3D worlds.

Anti-aliasing—A technique used to smooth out the jagged edges of polygons, which you sometimes see in video game graphics. This is accomplished by illuminating pixels along the edge of an image with colors that are a blend of the adjacent colors.

Bilinear interpolation—A technique used to improve the appearance of a textured surface when it's viewed from a given distance by blending the colors of adjacent texels.

Dithering—A technique used to enhance image quality by increasing the apparent number of colors beyond those which are actually used to display the image.

Environment mapping—A rendering technique used to create realistic-looking reflections on a surface. Reflections are everywhere in the real world, but generating reflections in real-time graphics requires a high-powered CPU.

Fog effects—A normal atmospheric effect that is used in games, fog can also be used to show that an object is far away.

Gouraud shading—Rendering a polygon with smoothly changing color across its face by blending colors evenly between two connecting surfaces.

MIP mapping—MIP is an acronym for a Latin phrase, *multi in partem*, meaning "many parts." This technique improves the appearance of an object's textured surface as it moves into close-up view by computing new textures based upon the distance of an object from you, the viewer. MIP mapping eliminates the pixelated look you sometimes see with objects in close-up views. Doom fans will be amazed at Doom 64 close-ups.

Trilinear interpolation—A rendering technique used to improve the appearance of a textured surface when viewed at a given distance by blending the colors of adjacent surfaces.

Z-buffer—A rendering technique where the distance from the viewer (Z) for each pixel is stored during rendering and used to determine where objects are displayed onscreen as they move in real time. For example, if the handlebars of a moving *Star Wars* speederbike have already been drawn in a given location onscreen, by comparing the distance from you, the viewer, to the nose of the speederbike to that of the handlebars, the CPU knows that the nose should not be drawn in front of the handle bars. G

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