Sega Saturn Tech-Speak Glossary

Hardware Power

Coprocessor-- A specialized chip that helps the CPU do specific kinds of computations, could be a chip dedicated to processing sound or graphics.

CPU (Central Processing Unit)-- The brains of a computer that actually does the calculating work. The best consoles transcend a single-CPU design with multiple processors. The Sega Saturn has eight processor chips.

Hertz (MegaHertz or MHz; kiloHertz or kHz)-- Literally, "times per second." A measure of frequency often applied to the "clock speed" of a computer and to the sampling rate of sound. It is equal to one cycle per second.

   MegaHertz-- Sega Saturn's SH2s run at 28MHz which means 28 million cycles per second.

   kiloHertz-- A measure for the sampling rate of sound. CD quality sound (and Sega Saturn) runs at 44.1 kHz which equal 44.1 thousand cycles per second.

Hitachi-- The makers of the advanced chips at the heart of the Sega Saturn; the Super H RISC Engine or SH-2 chip. There are two (2!) in each Sega Saturn, for parallel processing.

MPEG (Motion Picture Experts Group)-- Standards for the compression/decompression data-handling required in generating Full Motion Video.

Memory-- There are actually two kinds of memory: the RAM and ROM. RAM is the kind that a computer uses to perform its calculations; and ROM is the kind in which data is merely stored.

MIPS (Millions of Instructions Per Second)-- A shorthand measurement of computing calculations per second.

Parallel processing-- Found in super computers and in Sega Saturn: a way to use many chips in concert to get more horsepower than you can achieve with a single powerful (and expensive) chip. Works by dividing computing tasks into bite-sized pieces then assigning them to powerful specialized processors.

Pipelined Architecture-- Describes the way information flows through the machine where each specific processor works on a piece of the game that it specializes in and then moves the data on (á la parallel processing.)

RAM (Random Access Memory)-- The "chalkboard" on which a computer can perform its calculations. The bigger the better because it allows greater storage of higher quality graphics and sound which yields faster game play and amazing audio. Sega Saturn has 8 megs of RAM!

RAM: Buffer RAM-- Memory chips that hold data, freeing up the other processors and RAM chips to work even more efficiently.

RAM: D-RAM or SD-RAM (Dynamic RAM, Work Ram)-- The primary "work space" of a computer.

RAM: Audio RAM or Sound RAM-- Memory chips used exclusively for processing sound.

RAM: V-RAM (Video RAM)-- Memory chips used exclusively for processing graphics.

RISC (Reduced Instruction Set Computer)-- A powerful new streamlined processor. It is the next generation in microprocessor technology and is commonly found in expensive workstations. The Sega Saturn has three of these specialized chips.

ROM (Read Only Memory, "Boot" ROM)-- Memory containing "hard-wired" instructions that include the operating system of a computer; fixed software that starts running when a computer is turned on. It cannot be altered or "written to" by applications. The Sega Saturn has 512k. (That's a lot.)

Titan Arcade Architecture (ST-V)-- The advantage that Sega Saturn has over every other next generation machine; the Sega Saturn technology comes from what Sega perfects in its arcade machines first, which also allows us to port blockbuster arcade games quickly over to Sega Saturn, without losing any gameplay features.

SOUND

3D Audio (Surround Sound)-- A method of fooling the human ear whereby sound coming from only two speakers seems to come from all around. No kidding! Listen and you'll be amazed. See QSound.

Digital Audio-- Any sound that has been converted to computer-readable 0s and 1s; all digital sound is sampled. High sample rates can transcend the range of human hearing. All music CDs contain digital audio. Sega Saturn is capable of producing CD digital sound.

DSP (Digital Signal Processor)-- Fully programmable processor that allows on-the-fly programming for specific purposes, such as 3D audio. Sega Saturn has a 24- bit DSP dedicated to sound.

QSound-- A proprietary technology for producing 3D audio, licensed to Sega Saturn developers.

Sample rate-- The number of times per second that "slices" of a sound are captured for playback. All CD sound is sampled at 44.1 kHz.

Yamaha-- The makers of the custom-designed sound chip (DSP) found in the Sega Saturn.

GRAPHICS

3D-Model-- Three-dimensional representation of an object or person that can be positioned anywhere in space. The "Virtua Fighter" characters are 3D-modeled.

Bit-map-- A way of representing a picture or image as a collection of colored dots. Most computer graphics are displayed as bitmaps.

Cinepak-- A proprietary compression/decompression technology allowing Full Motion Video (FMV) to run in Sega Saturn software licensed to Sega Saturn game developers. The beautiful 3D introduction to "Panzer Dragoon" was compressed using Cinepak technology.

CG (Computer Graphics)-- Usually 3D rendered.

Duck TrueMotion-- A proprietary compression/decompression technology allowing Full Motion Video (FMV), to run on Sega Saturn software, licensed to Sega Saturn game developers.

FMV (Full Motion Video)-- Live action scenes, just like movies or TV.

FPS (Frames Per Second)-- The rate at which images appear in sequence such as a flip-book to produce a movie effect. Standard broadcast TV and videotape are 30 FPS; movies are 24 FPS. Video games can operate at up to 60 FPS.

Frame Buffering-- A technique to maximize graphic display performance by letting the graphics processor chip "set aside" images it has already calculated, allowing it to work on generating the next fraction of a second's visual magic; all while the screen itself is still busy painting the last fraction of a second's display.

Lighting-- An important ingredient in realistic graphics, showing increased brightness and shadows where they would appear and as they would change, depending on movement and player actions. These effects require designers to define one or more light sources in three ways: location, intensity and type of light.

Motion Capture-- A way of translating any animal movement into computer-readable (and reproducible) form, used for realistic animation. The process generates data that can then be used to control 3D models onscreen. "Virtua Fighter" characters were motion captured and Sega Sports games often use this technique to capture true player movements which translates into super realistic game play.

Palettes-- The set of all colors available for display at a time.

Parallax Scrolling-- An optical illusion in which a player watches the game surroundings shift as if he/she were actually present and moving within them. It requires a synchronization of staggered rates of scrolling the background and foreground playfields. You can see this effect in action in "Clockwork Knight".

Pixel-- The smallest dot on the TV (or computer) screen, which is independently told what color to show at every fraction of a second.

Playfields-- The background(s); anything on the screen that is not a sprite. When two playfields (layers of background) are controlled properly, parallax scrolling can result. The Sega Saturn has a whole chip dedicated to handling backgrounds (the VDP2, or "Video Display Processor 2") that can generate five distinct layers of background at the same time.

Polygons-- Literally the building blocks that any image can be constructed out of. Polygons are the building blocks of 3 dimensional objects and worlds.

Polygons/Second-- (1,000's of) The number of polygons of a given size that can be drawn on the screen in one second. This figure does not include the size of the polygons, nor their texturing or shading, or lighting.

Realtime-- An important adjective that usually indicates a game display is being re-calculated every fraction of a second, taking into account the full effects of player actions. When referring to a game's response or speed, it means the game responds instantaneously to the players commands.

Render-- Drawing 3D graphical objects on a computer or game machine. "BUG!" and "Clockwork Knight" are filled with beautifully rendered characters.

Rotation-- Turning an object (or background) to see it from other sides, and new angles.

Scaling-- Changing the size of an object as it approaches the player or retreats into the screen. Computationally demanding, but highly effective in conveying a sensation of motion toward and away from the player.

Scrolling-- Moving background playfields as if a camera were "panning" to see different areas of the game world. Sega Saturn can handle five simultaneous scroll-planes at once.

Shading-- (e.g. Gouraud shading) A step in the rendering process in which colors are darkened or brightened to realistically reflect how they would appear in the overall scene, given the (changing) lighting in a game world environment.

Texture-Mapping-- Copying a bit-map onto the faces of selected polygons to give the illusion of surface texture. "Daytona USA" is a great example of a texture-mapped game.

Wireframe-- A connect-the-dots approach to showing graphic objects by drawing lines between a set of points that make up a geometric outline.

Styles of Display:

3/4 perspective-- Showing action as if the "camera" were 75% of the way to a top-down perspective position. Objects appear at a slight angle, and their tops and two sides at a time are visible.

Dynamic Perspective-- Constantly changing the point of view ("camera angle") so that players feel they are weaving in and around the onsreen action. Requires heavy-duty realtime graphic processing. This can be seen in Sega Sports games on Sega Saturn.

First-Person-- A perspective showing what you would see if you were the game character within the game world. Typically requires strong scaling and rotation capabilities. "Panzer Dragoon" and "Daytona USA" are excellent examples of how immersive first-person perspective can be!

Multiple Perspectives-- This is best demonstrated by "Virtua Fighter" where the "camera" that shows the characters, and their worlds, changes position, typically in three dimensions: right/left, up/down, and in/out to give you the best view of the action. Actually it covers four dimensions, if you count the direction the camera points as well as its location. Make that five dimensions!

Side-Scrolling-- Viewing the action as if it is on a stage that scrolls by in front of you. "Astal" and "Clockwork Knight" are both side-scrolling games.

Top-Down-- Showing all action from directly overhead, the most precise method of showing relative positions and distances. Most Sega Sports games on Sega Saturn contain this view as one of the many viewing options.

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