[0066] Volumetric 3D displays suitable for use with the gaming machine **200** are commercially available from Actuality Systems under the designation Perspecta™ and from Genex Technologies, Inc. under the designation VolumeViewer®.

[0067] **FIG. 2***b* is an exploded view of the primary components of a volumetric 3D display **250** manufactured by Actuality Systems. The volumetric 3D display **250** generally includes a transparent enclosure **252**, a projection screen **254**, rasterization electronics **256**, a projection engine **258**, and relay optics **260**. The projection engine **258** is based on the Texas Instruments™ Digital Mirror Device™ technology, which utilizes a MEMS-based reflective array to create single-bit-depth frames at approximately 5 kHz. The projection engine **258** is a 3-SLM (spatial light modulator) projection engine, which uses a color-mixing prism to combine R, G, and B image components with 1-bit depth each.

[0068] A standard high-pressure mercury arc lamp illuminates a 3-SLM projector via an integrator rod and condenser lenses. The image of the SLMs is projected onto a the projection screen **254** that approximates a Lambertian diffuser, and has approximately 50/50 reflectance and transmission properties. The image is projected through the center of an open-frame DC motor that rotates the final fold mirrors and the screen. Unfolding the optical path reveals that the SLMs throw an image at a 45° angle onto the screen. The relay optics **260** compensate to provide clear focus across the projection screen **254**. The effects of keystoning and rotation of the SLM image in the plane of the projection screen **254** are reduced using real-time algorithms.

[0069] The CPU **104** shown in **FIG. 1** sends 3D data to the rasterization electronics **256**, which includes a graphics-processing processor. The rasterization electronics **256**, in conjunction with the CPU **104**, scan-converts the 3D data into coordinate system utilizable by the volumetric 3D display **250**. The graphics-processing processor is a TMS320C6201™ DSP manufactured by Texas Instruments.

[0070] As the geometric or volume data is rasterized, it is stored in graphics memory (e.g., 3 Gbits of DDR SDRAM) in the rasterization electronics **256**. The volumetric 3D display **250** is able to support higher-resolution imagery than is generated by the current projector system. Therefore, the graphics memory can be populated with 6 Gbits of RAM. Memory is partitioned into two volume buffers, each of which stores 198 slices of 768×768 imagery. A motor controller pages through memory in tight synchronization with the position of the rotating projection screen **254**, which is rotated in direction A. The graphics memory is read out to the projector subsystem at (24 volumes/second)×(1024×768 pixels/slice)×(3 bits/pixel)×(198 slices/volume)= 1.4 Gbytes/second. Full 1024×768 frames are loaded into the SLM even though only the central 768×768 is used.

[0071] Referring to the control system shown in **FIG. 1**, the video controller **108** corresponds to the rasterization electronics **256** which are coupled to the CPU **104** by a SCSI connection. Applications to display imagery on the volumetric 3D display **250** can be written in legacy or native format. A software development kit is available from Actuality Systems.

[0072] Turning now to **FIGS. 2***c* through **2***f*, the software-generated color 3D symbols **206** shown in **FIG. 2***a* are set in motion through software stored in the system memory **106** by the CPU **104**. In **FIG. 2***c*, the 3D symbols **206** are set in motion in a horizontal direction **262**. Note that the arrows in **FIGS. 2***c* through **2***e* are shown for ease of discussion, and are not actually displayed on the volumetric 3D display **202**. In **FIG. 2***d*, the 3D symbols **206** are set in motion in a vertical direction **264**. In **FIG. 2***e*, the 3D symbols are set in motion in random directions **266** in an embodiment, and in another embodiment, are set in motion in predetermined and varied directions **266**. Unlike traditional mechanical reels or simulated reels on a 2D display, when the 3D symbols **206** are set in motion, when they move to the background, they are actually still visible from another viewing angle relative to the volumetric 3D display **202**. The movement of the 3D symbols **206** shown in **FIG. 2***e* in a spatial volume cannot be recreated using traditional mechanical reels or simulated reels on a 2D display.

[0073] Eventually, the CPU **104** stops the 3D symbols **206** as shown in **FIG. 2***f* and displays a pay line **268** which is actually viewable from a 360 degrees viewing angle. The 3D symbols **270***a,b,c* inside the pay line **268** indicate the game outcome, and a payoff or credit, if appropriate, is provided to the player.

[0074] In contrast to the gaming machine **200** shown in **FIG. 2***a*, which shows a basic game displayed on the volumetric 3D display **202, FIG. 3** shows a gaming machine **300** displaying a bonus game on a volumetric 3D display **302**. The wagering game shown in **FIG. 3** is based on the Reel'em In!® game produced by the assignee of the present invention. The volumetric 3D display **302** displays 3D imagery corresponding to a group of fisherman **306** sitting around a lake in boats. Each fisherman **306** holds a fishing line **308** at the end of which is a piece of bait **310**. In this bonus game, bonuses are awarded depending on what combination of lake-dwellers and other objects displayed on a secondary display **304** are captured by the fishermen with their fishing lines **308**. The volumetric 3D display **302** and the secondary display **304** are controlled by the CPU **104** to present a unified image to the viewer such that an action on the volumetric 3D display **302** is linked with an action on the secondary display **304**. Thus, the fishing line **308** shown in the volumetric 3D display **302** appears to extend down to the bottom of the lake shown in the secondary display **304**.

[0075] B. 360 Degree Display

[0076] **FIG. 4** is a perspective view of a gaming machine **400** having a 360 degree display **402** that displays a bonus game according to an embodiment of the present invention. A 360 degree display is a type of POV display that exploits the brain's retention of an image longer than the eye actually perceives it to create 2D imagery about a 360 degree surface. The primary components and operation of a typical 360 degree display is described in connection with **FIG. 5**.

[0077] In **FIG. 5, a** 360 degree display **500** generally includes a base **504**, a display body **502** rotatably mounted on the base **504** and multiple light emitting arrays **506** each equally spaced on a surface of the display body **502**. Each of the light emitting arrays **506** is composed of multiple light emitting units, such as light emitting diodes **508** (LEDs). A set of three LEDs **508***a,b,c* are shown which emit red, green, and blue colors, respectively.

[0078] The rotatable display body **502** of the 360 degree display **500** is cylindrical in shape, and each of the light