[0010] The passive matrix system has significant drawbacks, notably slow response time and imprecise voltage control. Response time refers to the Liquid Crystal Displays ability to refresh the image displayed. Imprecise voltage control hinders the passive matrix's ability to influence only one pixel at a time. When voltage is applied to untwist one pixel, the pixels around it also partially untwist, which makes images appear fuzzy and lacking in contrast.

[0011] Active-matrix Liquid Crystal Displays depend on thin film transistors (TFT). Thin film transistors are tiny switching transistors and capacitors. They are arranged in a matrix on a glass substrate. To address a particular pixel, the proper row is switched on, and then a charge is sent down the correct column. Since all of the other rows that the column intersects are turned off, only the capacitor at the designated pixel receives a charge. The capacitor is able to hold the charge until the next refresh cycle. And if the amount of voltage supplied to the crystal is carefully controlled, it can be made to untwist only enough to allow some light through. By doing this in very exact, very small increments, Liquid Crystal Displays can create a grey scale. Most displays today offer 256 levels of brightness per pixel.

[0012] A Liquid Crystal Display that can show colours must have three subpixels with red, green and blue colour filters to create each colour pixel. Through the careful control and variation of the voltage applied, the intensity of each subpixel can range over 256 shades. Combining the subpixel produces a possible palette of 16.8 million colours (256 shades of red×256 shades of green×256 shades of blue).

[0013] Liquid Crystal Displays employ several variations of liquid crystal technology, including super twisted nematics, dual scan twisted nematics, ferroelectric liquid crystal and surface stabilized ferroelectric liquid crystal. They can be lit using ambient light in which case they are termed as reflective, or backlit and termed Transmissive. There are also emissive technologies such as Organic Light Emitting Diodes, which are addressed in the same manner as Liquid Crystal Displays. These devices are described hereafter as image planes.

[0014] Another subset of LCDs, known as "transflective" or partially reflective displays, is important to consider. In this application, a portion of the rear part of the liquid crystal subpixel cell (either internally or externally) is coated with a light reflecting material. The coverage achieved by this reflector material may comprise from 20% to 30% or more of the total active (light transmitting) area of a given subpixel. Any incident light on this part of the cell coming from a rear-mounted backlight would not be able to reach the viewer's eye unless it were diffused and re-reflected in another spot. However, the equivalent portion of ambient light from overhead fluorescent lighting or even the sun would pass through the cell's colour filter and liquid crystal layer to be reflected (after appropriate greyscale modification) back to the user. This system allows portable colour (or even monochromatic) displays such as Tablet PCs, PDAs, and even cell phones to be easily readable even in the harshest of ambient lighting environments without requiring the energy drain on a battery produced by an emissive backlight.

[0015] Common to the display marketplace are "emissive" displays such as CRTs where the luminance of a characteristic colour, shade and brightness is derived from electronically excited photon emission at the subpixel site itself. There are other emissive display technologies which are consistent with this description such as those based on Organic Light Emitting Diodes (OLEDs), Electroluminesce (EL), and plasma. Each of these technologies can be used in conjunction with an overlying transmissive (or even transflective) liquid crystal display to achieve a Multi-Layer configuration.

[0016] No known reproduction process can exactly capture the original elements in a given situation (e.g. the brightness of the sun shining down on a landscape). All colour reproduction systems can hope to do is replicate the relative differences between objects in the original view. The ratio of the whitest point to the blackest point in a scene is know as its dynamic range, which must be reproduced on some medium such as film, a CRT, an LCD, or paper. The characteristics of this medium, or its "native response," will determine the level of success a given reproduction achieves. The number of steps, or grayscale, into which this dynamic range can be subdivided determines the resolution of a particular primary colour. A typical monitor system will have the ability to display 8-bits, or 256 shades per primary colour for a total of over 16.7 million colours (256×256×256). This is known as the colour depth or image palette of the display system.

[0017] All display mediums, especially CRTs, introduce some amount of distortion, which has to be corrected to make the reproduced image look "proper." The human eye sees logarithmically. To compensate for this, playback or image reproduction media must mimic the human visual response curve so that the display shows information in a way we are used to seeing. The resulting response curve varies in an exponential manner known as the "gamma curve" which is a polynomial equation describing any point on a curve native to a particular monitor. In a typical imaging system, the brightness changes very little at the lower energy grey levels causing some compression of the shadow detail where our eyes are the most sensitive. So instead of a straight-line, linear response where there is an equal amount of output for every value of input, the curve has a long, shallow beginning before it begins to climb.

[0018] Video or static images or scenes that are created, edited, stored, and then presented on flat panel media which displays them according to the luminance or brightness values which the author or editor imparts to them. Once they are imprinted and/or duplicated, further changes to the luminance properties of the content being displayed are only possible if applied to ALL the content. Until now, no method has been devised for controlling individual portions of a given scene, frame, or series of frames in a prescribed, dynamic fashion. Such a device or method would be useful.

[0019] All references, including any patents or patent applications cited in this specification are hereby incorporated by reference. No admission is made that any reference constitutes prior art. The discussion of the references states what their authors assert, and the applicants reserve the right to challenge the accuracy and pertinency of the cited documents. It will be clearly understood that, although a number of prior art publications are referred to herein, this reference does not constitute an admission that any of these documents form part of the common general knowledge in the art, in New Zealand or in any other country.