TABLE 1

Zone	Zone Radius (mm)	Step Width (mm)
1	0.661	0.661
2	0.934	0.274
3	1.145	0.210
4	1.322	0.177
5	1.478	0.156
6	1.619	0.148
7	1.748	0.130
8	1.869	0.121
↓		
190	9.108	0.024
191	9.132	0.024
192	9.156	0.024
193	9.180	0.024
194	9.204	0.024
195	9.227	0.024
196	9.251	0.024

[0158]

TABLE 2

Zone	R (mm)	Height (mm)
1	0.0001	1.101
1	0.05	1.102
1	0.1	1.380
1	0.15	1.106
1	0.2	1.109
1	0.25	1.114
1	0.3	1.120
1	0.35	1.126
1	0.4	1.134
1	0.661	1.890
2	0.662	2.292
2	0.707	2.305
2	0.753	2.318
2	0.798	2.332
2	0.844	2.348
2	0.889	2.364
2	0.934	2.381
3	0.935	3.482
3	0.977	3.499
3	1.019	3.516
3	1.061	3.534
3	1.103	3.552
3	1.145	3.571

[0159] Lighting System for Reflective Liquid Crystal Display

[0160] The details of a lighting system for a reflective microdisplay of the invention will now be described in connection with **FIG. 6A**. Illumination for a reflective LCD system **500** based upon the active matrix circuit described heretofore in connection with FIGS. **2A-2M** is provided by an array of Light Emitting Diodes (LED(s)) **501** disposed adjacent light-diffuser **505** which uniformly transmits the source LED light to a linear polarizer **502**.

[0161] The linear polarized light **516** from polarizer **502** is passed to a polarizing beamsplitter or prism **508** which is reflected by beam beamsplitter **508** and is incident on specularly reflective LCD **506** to provide the requisite illumination. The light incident on LCD **506** is selectively reflected **514** to generate an image that is rotated by ¼ wave plate **504** so that it is transmitted through splitter **508** and through lens **510** to the observer **512**.

[0162] Another preferred embodiment for a reflective microdisplay **518** is illustrated in **FIG. 6B**. A display **520** has the microdisplay **518** with an active matrix portion **522**. The active matrix portion **522** has a pixel element **523** spaced from a counterelectrode **524** by an interposed liquid crystal material **525**. Each pixel element **523** has a transistor **526** and a pixel electrode **527**. The pixel electrodes **527** overlie the transistor (TFT) **526**, located in an epoxy layer **528**, where the pixel electrode protects or shields the TFT **526** from light. The pixel electrodes **527** are spaced from the channel lines **530** by a layer of oxide **532**. The counterelectrode **524** is connected to the rest of the circuit by solder bumps **533**. The active matrix **522** has a layer of glass **534** above the counterelectrode **524**. The microdisplay **520** is carried with a case **536**.

[0163] The display **520** has a dichroic prism **538** located between the active matrix **522** of the microdisplay **520** and a lens **540** for viewing the microdisplay **520**. The lens **540**, the dichroic prism **538** and the microdisplay **520** are carried in a display housing **542**. The display housing **542** also has a plurality of light emitting diodes (LEDs) **544**. The LEDs **544** in red **544**r, blue **544***b* and green **544**g are mounted to a circuit board **546** which is connected to a timing circuit. A diffuser **548** is interposed between the LEDs **544** and the dichroic prism **538**. The light from the LEDs **544** is directed by the prism **538** towards the liquid crystal **524** of the active matrix **522**. The light which is reflected back by the pixel electrodes **527** passes through the prism **538** towards the lens **540**. As in the transmissive displays, the LEDs are flashed sequentially.

[0164] **FIG. 6C** shows an alternative method of lighting the active matrix **588** of a reflective microdisplay **590**. Similar to the previous embodiment, a dichroic prism **592** is interposed between the microdisplay **590** and the lens **593**. A light source housing **594** is contained within the display housing **595**. The light source housing **594** has a plurality of light emitting diodes (LEDs) **596**. The LEDs are located in cells. A pair of dichroic mirrors **597** and **598** are located in the lighting housing **594** to direct the desired light from each color light source along a common axis towards the prism **592**. The prism **592** reflects the light similar to the previous embodiment.

[0165] Shown in FIGS. **7A-7C** are preferred embodiments of an LED backlighting system utilizing a diffuser for a transmission display in accordance with the invention. In a first embodiment of an LED illumination system **400** shown in **FIG. 7A**, blue (B) **402**, green (G) **404**, and red (R) **406** LEDs are optically coupled to a flat diffuser element **408** around the periphery of an illumination area of **410** that is positioned adjacent the display active or viewing area. For a display having a diagonal of 6.35 mm, the side of **412** of the viewing area **410** can be about 3.81 mm in size, and the length **414** of the viewing area can be about 5.08 mm. The diffuser **408** can be a plastic material such as acrylic and the back of the diffuser can be coated with a reflective material to improve light output of the device.

[0166] In another embodiment of an LED display illumination system **420** as shown in **FIG. 7B**, the LED's **422** are coupled in pattern to the edge of the diffuser **408**. The LEDs **422** are actuated in sequence **407** to provide color sequential operation with fewer LEDs.

[0167] In the system **430** of **FIG. 7C**, the display **432** is coupled to an angled diffuser **436** at interface **440**. The linear