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Sharp Develops LCD Switchable Between 2D and 3D Viewing

Revolutionary Display Technology Offers Highly Realistic Sense of Depth

Sharp Works Toward Establishment of 3D Display Consortium

Sharp Corporation and Sharp Laboratories of Europe, Ltd.*¹ have succeeded in developing a new LCD capable of displaying 3D images, which does not require the use of special glasses. This LCD is electrically switchable between 2D viewing (planar mode) and 3D viewing (stereo mode). This innovative display can lead not only to the development of dedicated 3D display equipment that provides a realistic sense of depth and presence, but can also be used in existing LCD application products, opening up new worlds of enjoyment far beyond what is currently available. For example, in the PC field, it functions as an ordinary 2D display for applications such as word processing or spreadsheets. Switching to 3D display mode, it lets users enjoy specialized 3D content such as computer graphics or games with an amazingly vivid sense of depth and immediacy.

In addition, we will also be working toward expanding the use of 3D LCDs. To increase the content available for them, we intend to build cooperative relationships and alliances with companies in a wide range of industries, including hardware, software and content, and will work to establish a consortium for the creation of new businesses related to 3D displays.

In 1973, Sharp was the first to successfully mass produce LCDs for use in electronic calculators. Since then, we have actively promoted innovation in display technologies, going from simple numeric displays to dot-matrix graphic displays, moving from monochrome to color displays, and on to full-motion video displays.

This new 3D LCD provides a highly realistic sense of depth that is impossible to achieve with conventional displays. A "dream display" destined to offer new enjoyment and open up new markets, this 3D LCD will allow Sharp to contribute to the further development and penetration of LCD application products.

Principle of Operation of 3D LCDs

- A 3D display requiring no special viewing glasses is generated by controlling the path of travel of light from the display so that slightly different images reach the left and right eyes; in other words, the right eye sees only the image intended for it, and the left eye only the image intended for it.
- This newly developed 3D LCD employs a technique called the "parallax barrier," an older, well-known approach to generating a stereo display. The 3D LCD combines a conventional TFT LCD with a Switching LCD, a proprietary Sharp development.
- This Switching LCD establishes an optical parallax barrier, and by controlling the path of travel of light, makes it possible to separate the display images so that slightly different images reach the left and right eyes.
- By displaying the image intended for the left eye and the image for the right eye as a stereographic pair on a TFT LCD, each eye sees only the image intended for it and the brain combines the images and perceives them as a 3D representation.
- In addition, the Switching LCD electrically controls the parallax barrier to make it transparent, eliminating its ability to separate light paths. This way, the right and left eyes can see the same image when viewing ordinary 2D content. In other words, the display can also function as a conventional standard imaging device.

Figure 1: 3D display

A parallax barrier is used to separate the light paths, so that different light reaches the left and right eyes, resulting in a three-dimensional image.

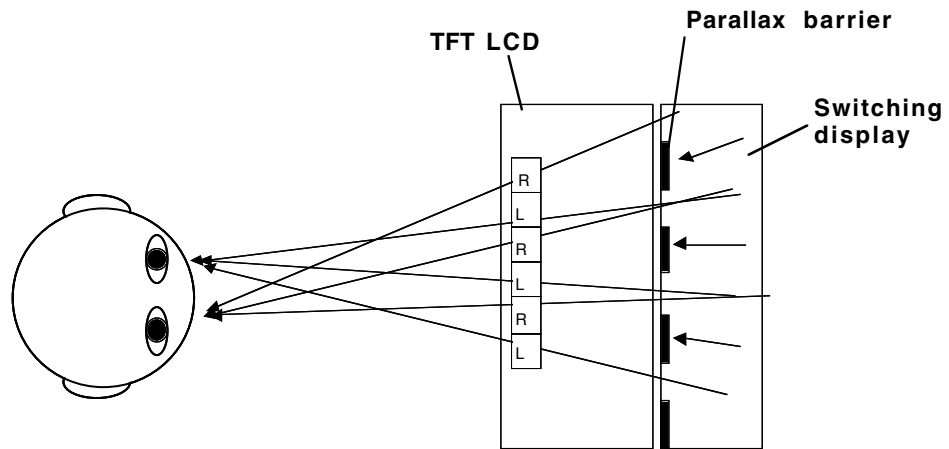
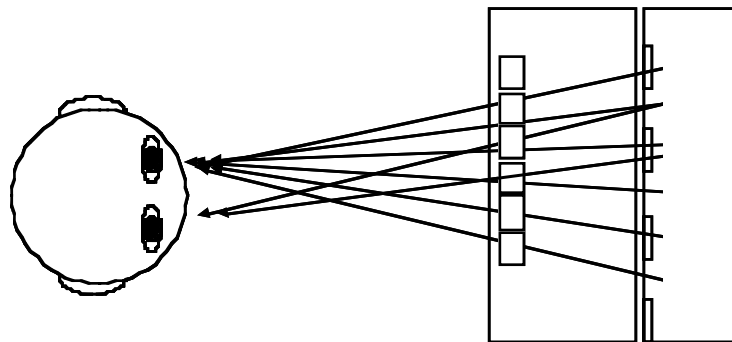


Figure 1: 2D display

The Switching LCD controls the parallax barrier to make it transparent. The same images reach the left and right eyes, enabling 2D viewing.



Features

- 3D display possible without the need for special glasses.
- Electrically switchable between planar (2D) and stereo (3D) viewing modes.
- Simple panel design and drive system made through the combination of a Switching LCD, which employs a parallax barrier technique, with a conventional TFT LCD.

Applications

Large formats: Computer displays, LCD TVs, computer graphics, CAD/CAM, retail sales displays, medical imaging, etc.

Small/medium formats: PDAs, electronic organizers/picture books, amusement such as game machines, etc.

*1 Sharp Laboratories of Europe, Ltd.

Established: February 1990

Representatives: Managing Director Stephen Bold

Deputy Managing Director Yasuhito Nakagawa

Location: Oxford, United Kingdom

No. of employees: Approx. 80

Activities: Research and development in areas such as optoelectronics and information processing technologies